Fieldiana, Botany

FLORA OF PERU

BY

J. FRANCIS MACBRIDE

CURATOR, PERUVIAN BOTANY

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Library of Congress Catalog Card Number: 36–10426

PRINTED IN THE UNITED STATES OF AMERICA
BY CHICAGO NATURAL HISTORY MUSEUM PRESS

FLORA OF PERU

J. Francis Macbride

BIGNONIACEAE [Juss.] Persoon. Bignonia or Trumpet Vine Family

References: Bureau & K. Schumann in Mart. Fl. Bras. 8, pt. 2. 1896; Sandwith, Fl. Suriname 4, pt. 2: 1–86. 1938.

Erect or scandent, rarely herbs, ordinarily ligneous, the usually lenticellate branches often closely glandular in vicinity of nodes, the leaves often immersed glandular, these commonly opposite or nearly, rarely spiralled, simple or frequently and variously compound, but mostly conjugate or ternate. Axillary buds (outer scales) if obvious stipuliform, small or more or less foliaceous, sometimes seriate. Inflorescence terminal or/and axillary, a raceme or thyrse, somewhat compound or now and then 1–few-flowered. Flowers hermaphrodite, little or rarely distinctly zygomorphic; calyx truncate, denticulate to lobed or spathe-like, then early or tardily split; corolla in general funnelform, tube more or less defined, lobes rarely valvate. Fertile stamens 4, didymous, the staminode sometimes reduced or obsolete, the anther cells parallel or divaricate, one rarely imperfect. Disk if present annulate, cupulate or solid. Ovary bicelled or 1-celled, the few to usually many ovules on 2 (rarely 1) commonly axial placentae. Fruit if capsular with 2 valves either parallel or at right angles to the septum, sometimes baccate and indehiscent. Seeds exalbuminous, clearly or little compressed, thinly or stoutly alate, infrequently not alate, sometimes marginate, and included in a pulp.

For convenience the bud scales that, developed, simulate stipules may be so termed hereafter to avoid the accurate but clumsy name "pseudo-stipules;" anyone wishing to emphasize the obvious may read "bud scales."

It is fortunate that the studies of Sandwith—see, especially, besides Fl. Suriname, l.c., Recueil Trav. Bot. Néerl. 34: 205–232. 1937, i.e. Meded. Bot. Mus. Rijksuniv. Utrecht, and Kew Bulletin 1932–1959—have permitted the preparation of the following synopsis with many problems of nomenclature and classification clarified; it is unfortunate that he himself declined to present an account. However, except for my own phrasing, his published work has been copied or at least his judgments. I am indebted also to the considerate pre-

sentation of the family as it occurs in the Mayan area by Russell J. Seibert, Carnegie Inst. Wash. Misc. pap., no. 21: 377–434. 1940, and for his paper on glands, Ann. Mo. Bot. Gard. 35: 123–136. 1937. A morphological study of the various types of staminodia was made by Josef Rohrhofer (under Wettstein), Oesterr. Bot. Zeitschr. 80: 1–30. 1931, with many drawings and a bibliography; he found the sterile stamen similar in genera considered related. Significant studies of the pollen grains were done by Urban (Berichte Deutsch. Gesellsch. 34. 1916), by Pichon (Bull. Soc. Bot. France 92: 1946), by J. C. Gomes, Jr. (Rodriguésia 32 (20): 112–118. 1957), and by others, as cited. Pichon, l.c. by proposing a number of genera based especially on character of pollen has pointed up the contradictory evidence or interpretation of relationships within the family.

Especially important in relation to the taxonomy for this group may be the anatomy; in realization of this, Bureau & Schumann made, l.c. 6–10, an anatomical key to the Brazilian genera which Dr. S. Carlquist of the Rancho Santa Ana Botanic Garden plans to translate and devise to include the Peruvian species. Metcalfe & Chalk, Anat. Dicot. 2: 1002–1013. 1950, give an outline of the previous research in this field: there are several types of anomalous secondary thickening; wedge-shaped masses of phloem in the xylem occur (first) and variations in the anomalous structure are a valuable aid to the identification of at least some genera; for instance, in Peru, *Amphilophium, Anemopaegma, Clytostoma, Cydista, Lundia, Phryganocydia, Pyrostegia, Tynnanthus* and *Distictella* have similar structure but combined successive rings of growth. As regards the few trees, Record & Hess, "Timbers of the New World," is a useful work.

Perhaps the classification here following the acceptance of the ideas of Miers, Bureau and Schumann has proceeded too consistently or/and expediently on a basis of tradition and logic. For one over-all picture as regards generic considerations see Sandwith, Kew Bull. 1953: 466. 1954, in reference to *Chodanthus* Miers and *Mansoa* P. DC.; these apparently are not yet known within Peru but allied to *Pseudocalymma* Sampaio & Kuhlmann, a segregate from *Adenocalymma* Mart. and to *Onohualcoa* Lundell, an alliance that may be emphasized for study when evaluating the presence or absence of pubescence, of gland fields at the nodes (and elsewhere), of tubercles on capsules, the number of rows of ovules in the cells or the characteristics of the pollen grains as criteria for generic definition. As to pollen the grains may be furrowed or not but rarely not clearly; as in the Brazilian genus *Gardnerodoxa* Sandw., Kew Bull. 1954: 611–

614. 1955, they may be a basic clue in association with the more usual characters of tendrils, gland fields, number of ovules, etc. It must take a good deal of personal spoofing to argue seriously about the validity of many of the hundred or so genera currently keyed out, not a few only negatively, and on characters developed in varying degrees in this family, all of them together with probably not many more species—valid ones, that is. However, the careful and sensible interpretations of the present specialist as regards specific variables suggests that he is adding and has added greatly to an understanding of the group relationships so that one may infer that eventually many names can be applied even in horticulture with confidence.

Bignonia L., Gen. Pl. 179. 1763, commended the Abbé Jean Paul Bignon, court librarian to Louis XIV, and until it became the mode to emphasize dissimilarities more than similarities as evidence of natural relationship the name included besides *B. radicans* L., now *Campsis radicans* Seem., a majority of the known species. Ever-accumulating information and new methods of acquiring it have also resulted in the present dissociation, apparently to an extreme degree destroying the general usefulness of the taxonomy, to little if any purpose.

Sandwith has observed that *Anemopaegma* Mart., *Distictella* Kuntze, and *Martinella* Baillon have veinlets so intricately impressed that under a lens the leaflets appear shagreened. A majority of Peruvian species darken, even blacken, in drying; discoloration unless merely brownish has generally not been indicated in the descriptions.

These mostly tropical vines and trees are notably ornamental; Edwin A. Menninger, to his great credit, has succeeded in introducing a number, known in Peru, at Stuart, Florida, while *Catalpa* Scop. and the Trumpet Vine (*Campsis*), sometimes north temperate, are found in gardens in Peru; a useful synopsis of the former has been made by Paelt (Candollea 3: 241–285. 1952).

Dr. Humberto A. Fabris, Museo de La Plata, merits special acknowledgment for his useful account of the species known to be in cultivation in Argentina (Inst. Bot. Agric. 10, fasc. 173: 1–57. 1959); a number of the plants described and illustrated may be used as ornamentals also in Peru. Dr. Fabris' excellent synopsis, with a practical generic key, descriptions, illustrations and extensive bibliography, is part of a series pertaining to horticulture started in 1950 but which, unfortunately, only recently has been brought to my attention.

A generic key, after that of Bureau and Schumann, Pflanzenfam., l.c., and Mart. Fl. Bras., l.c., and an artificial one have been devised,

following the example of both Seibert and Sandwith for other areas. An anatomical key would be desirable also. Since most herbarium material is only in flower and many specimens show only uppermost branchlets it has been necessary to make secondary, when possible, the probably important characters of mature branches, nodal glands. The tenuous demarcation of many generic concepts results even with complete materials in a correspondingly weak key, often only suggestive, burdened with exceptions. However, Bureau wrote in 1864, in his monograph of Bignoniaceae: "I could not overemphasize the importance for the study of Bignons of collecting with care the fruits at the same time as the flowers; it is on the structure of the fruits that one is forced to establish the basic classification."

Preparation of this account as for many other families has been tremendously aided by the cooperation of Ira Wiggins and associates at the Natural History Museum, Stanford University, and by Phillip Munz and associates at the Rancho Santa Ana Botanic Garden, Claremont, California; in both institutions the special botanical libraries are outstanding and usable because of ready availability. In recent years the work has benefited too by the friendly help of Mrs. Dorothy M. Halmos, able librarian at the University of Southern California, Hancock Library, where, it is not generally known, are many rare botanical books obtained from the collection of the Boston Museum of Natural History. My indebtedness to my contemporaries at the University of California and at our National Herbarium, Smithsonian, has been recorded in other numbers of this work.

KEY (cf. Pflanzenfam.; after Bureau and Schumann)

Ovary perfectly 2-celled; fruit capsular, seeds winged.

Septum parallel to valves; plants usually scandent. Tribe Bignoniae.

Septum contrary to valves; plants rarely twining, hardly ever scandent. Tribe Tecomeae.

Ovary usually 1-celled; fruit baccate or if dry not dehiscent; seeds exalate, often marginate; shrubs, trees, rarely epiphytes as *Campsis*. Tribe Crescentieae.

Exceptions: 43. *Eccremocarpus*; 44. *Calampelis*, 1-celled capsule, dehiscent base to tip, seeds alate; 45. *Tourrettia*, ovary 4-celled, capsule apically dehiscent, seeds alate. First two half shrubs in age, scandent by tendrils, as sometimes the third, but annual.

Tribe BIGNONIAE

Tendrils filiform, sometimes stout, sometimes in a disk terminating, never clearly compressed-uncate.

Leaves ternate or conjugate or simple (rarely biternate, *Arrabidaea inaequalis*, or only lower leaves, as *A. bracteolata*).

Disk developed except *Tynnanthus* with clearly bilabiate corolla.

Corolla aestivation descending-imbricate.

Calyx not at all inflated.

Calyx simple.

Calyx truncate, dentate, lobate but lobes not at all elongate-subulate.

Corolla infundibuliform-campanulate, rarely clavate, not elongate or bilabiate.

Corolla ventrally not at all saccate.

Tendrils simple unless *Pseudocalymma*, only garlic-scented genus.

Capsules narrow; valves coriaceous, plane; calyx eglandular.

Calyx narrowly campanulate or rarely tubular; anthers glabrous (cf. *Saldanhaea*). 1. *Arrabidaea.*

Calyx patelliform or lax; buds apically puberulent; anthers pubescent. 2. *Petastoma.*

Capsules broader or stouter, exalate (cf. *Xylophragma*).

Valves smooth or unevenly tubercled; calyx, bracts often glandular; stipules small.

Anthers glabrous; corolla not seriately glandular.

Nodal glands obvious; flowers purplish. 3. *Pseudocalymma.*

Nodal glands obsolete; flowers yellow, white or pink. . 4. *Adenocalymma.*

Anthers villous; corolla seriately glandular.

Gland areas obsolete; stipules obsolete or foliaceous. . . . . 2. *Petastoma.*

Gland areas prominent; stipules subulate, seriate.....5. *Pachyptera.*

Valves smooth, broadly elliptic, acute both ends; stipules often large.

Branches angled; calyx eglandular as stem nodes.....6. *Anemopaegma.*

Branches not angled; calyx sometimes, stem nodes always, glandular. 7. *Pseudopaegma.*

Valves echinate-tuberculate; flowers few–many; stipules usually foliaceous.

Calyx broadly campanulate, rarely 1-cleft. 8. *Clytostoma.*

Calyx long-tubular, cleft..9. *Scobinaria.*

Tendrils trifid; inflorescence very lax; nodal glands none.....10. *Martinella.*

Corolla not at all saccate, often curved.

Branches angled with paler lines or ribs; capsule echinate.....11. *Pithecoctenium.*

Branches terete, not striate; capsule tomentose. 12. *Distictella.*

Corolla ventrally saccate, not curved; capsule very slender, valves convex.....13. *Paragonia.*

Corolla elongate, subregular, tube elongate, lobes relatively short.

Flowers (Peru) from old wood, tube cylindric; capsules very broad, valves ligneous. 14. *Tanaecium.*

Flowers with leaves, tube graduated from base; capsule narrow, valves coriaceous. 15. *Macranthosiphon.*

Corolla bilabiate as in Labiatae.

Corolla 6–7 mm. long; pollen grains exine smooth. 16. *Tynnanthus.*

Corolla 1.5–2 cm. long; pollen grains reticulate. 17. *Mussatia.*

Calyx lobes subulate from tubular base.

Calyx glandular; vix in Peru.....*Mansoa.*

Calyx eglandular; vix in Peru.....*Setilobus.*
Calyx double, 3-lobed within.....18. *Amphilophium.*
Calyx inflated.
Leaves clearly pellucid punctate; capsule very narrow.
19. *Stizophyllum.*
Leaves not at all obviously pellucid punctate.
20. *Callichlamys.*
Corolla aestivation valvate; corolla subulate.
Tendrils filiform.....21. *Pyrostegia.*
Tendrils ending in a disk; vix in Peru.....*Glaziovia.*
Disk none (cf. *Tynnanthus* with bilabiate corolla).
Calyx truncate or dentate; anthers pilose.....22. *Lundia.*
Calyx as above; anthers glabrous.
Tendrils simple; pollen not sulcate.....23. *Cydista.*
Tendrils trifid; pollen multisulcate.....24. *Roentgenia.*
Calyx spathe-like, cleft.....25. *Phryganocydia.*
Leaves 5-digitate in part; capsule linear, tuberculate; flowers from old wood.
Calyx short, about 4 mm. long; capsule linear..26. *Saldanhaea.*
Calyx long, about 1 cm.; capsule broad.....27. *Xylophragma.*
Leaves biternate or more composite (cf. *Arrabidaea inaequalis*, maybe in Peru).
Calyx rarely inflated; branches terete.....28. *Memora.*
Calyx not at all inflated; branches quadrate....29. *Pleonotoma.*
Tendrils uncate.
Calyx spathe-like, 1-cleft.....30. *Macfadyena.*
Calyx truncate or dentate.....31. *Doxantha.*

Tribe TECOMEAE

Leaves bipinnate; fruit disk-like or ellipsoid; staminode elongate.
32. *Jacaranda.*
Leaves with incised-pinnatifid leaflets; erect herb; staminode short.
33. *Argylia.*
Leaves pinnate at least in part, if leaflets only 3, middle one much larger; staminode short.....34. *Campsis,* 35. *Tecoma.*
Leaves palmately divided or simple; staminode short.
Flowers yellow or green; alate seeds entire.

Capsule smooth; flowers yellow.....36. *Tabebuia.*
Capsule costate; flowers green, yellow or orange.
Stamens glabrous; flowers green.....37. *Cybistax.*
Stamens pilose; flowers orange, yellow-spotted.
38. *Godmania.*
Flowers white or tinted; seed wing lacerate...39. *Sparattosperma.*
Leaves all simple; flowers red-purple or roseate; fruit valves somewhat excavated.....40. *Delastoma.*

Tribe CRESCENTIEAE

Calyx campanulate or subtubular, truncate or lobulate; corolla not at all plicate; ovary 2-celled; leaves decussate...41. *Schlegelia.*
Calyx biparted or 1-cleft; corolla transverse plicate; ovary 2-celled; leaves spiralled.....42. *Crescentia.*
Exceptions: see beginning of key.

SUPPLEMENTARY KEY

Herbs, annual or perennial.
Erect perennial.....33. *Argylia.*
Sprawling, or scandent by tendrils, annual.....45. *Tourrettia.*
Scandent by tendrils, half shrubs in age.
Anther cells parallel to tip; calyx ampliate..43. *Eccremocarpus.*
Anther cells divaricate above; calyx small.....44. *Calampelis.*
Ligneous unless toward tips.
Fruit indehiscent; seeds not alate; plants not scandent unless by rootlets; leaves (Peru) simple.
Trees, shrubs; fruit gourd-like; calyx not cleft; corolla orange-yellow, ample.....42. *Crescentia.*
Aerial rootlets more or less developed; calyx cleft; fruit berry-like; corolla small, not yellow.....41. *Schlegelia.*
Fruit dehiscent, capsular, septifragal; plants erect or scandent by tendrils (often caducous), rarely by rootlets, then leaves pinnate, fruit loculicidal (*Campsis*).
Lianas, sometimes herbaceous above (rarely erect early or as habitat forms, or appressed as juveniles to trunks).
Calyx obviously campanulate, not at all or little longer than broad, then, especially, coriaceous, truncate, entire, den-

ticulate, or rather tardily lobulate, a few to many mm. long.

Corolla bilabiate; calyx a few mm. long, simple.

Corolla 6–7 mm. long; pollen grains smooth; leaves eglandular.....16. *Tynnanthus.*

Corolla 1.5 cm. long; pollen reticulate; leaves glandular beneath.....17. *Mussatia.*

Corolla not bilabiate unless *Amphilophium* with double calyx; calyx except in *Saldanhaea* and *Arrabidaea divaricata, florida,* rarely *brachypoda,* longer than 4 mm.

Calyx membranous or firm-membranous at least marginally.

Corolla yellow or white (lilac-lined, *Roentgenia*) except *Lundia.*

Disk developed; bracts caducous or small.

Inflorescence rather ample; leaflets ovate, to about 1 dm. long; gland areas obvious; calyx margined; anthers pilose.....22. *Lundia.*

Inflorescence short; anthers glabrous; leaflets to 1.5 dm. long or longer, except *Doxantha.*

Calyx lobulate, pubescent; no gland areas; pollen not sulcate.....19. *Stizophyllum.*

Calyx entire or denticulate.

Tendrils finely trifid, evanescently uncate.

No gland areas; branches angled; pollen not sulcate.....6. *Anemopaegma.*

Gland areas; branches terete; pollen 6-sulcate.....7. *Pseudopaegma.*

Tendrils coarsely claw-like, trifid. 31. *Doxantha.*

Disk obsolete; persisting linear bracts conspicuous. 24. *Roentgenia.*

Corolla not yellow or white (normally).

Corolla buds not apically tomentose.

Calyx small, rarely 6 mm. long.

Flowers, leaves castaneous, part.1. *Arrabidaea.*

Flowers from old wood; calyx about 3 mm. long; capsule narrow, rugulose; pollen tetrads. 26. *Saldanhaea.*

Calyx 1 cm. long, deeply or broadly campanulate or lax.

Gland fields none; branches subquadrate; capsules echinate.....8. *Clytostoma.*

Gland fields; branches striate; garlic-scented; capsules smooth.....3. *Pseudocalymma.*

Corolla buds tomentulose apically; calyx often open, lax; gland fields none; capsules smooth. 2. *Petastoma.*

Calyx coriaceous, rigid or double-lobed.

Corolla not yellow.

Calyx not double; corolla white or purple or roseate.

Disk none; flowers in part white, few; pollen not sulcate; capsules smooth.....23. *Cydista.*

Disk developed; flowers rose-pink, many; pollen 3-sulcate; capsules tuberculate.13. *Paragonia.*

Calyx double; corolla red; pollen multisulcate; capsules smooth or rugulose....18. *Amphilophium.*

Corolla yellow, cream or white, velvety.

Leaves conjugate or ternate.

Branches angled with paler lines, ribs; capsules echinate.....11. *Pithecoctenium.*

Branches terete, not striate; capsules tomentose. 12. *Distictella.*

Leaves biternate, in part.

Branches terete or subterete.....28. *Memora.*

Branches acutely quadrate.....29. *Pleonotoma.*

Calyx not campanulate, usually clearly longer than broad, subcylindric to obconic, ordinarily membranous at least above, rarely coriaceous or gland-dotted (as *Adenocalymma*), often truncate-denticulate, sometimes unevenly short-lobulate, also spathe-like and 1-cleft, rarely inflated.

Corolla entirely yellowish or whitish to orange unless *Callichlamys;* stamens included, anthers glabrous (cf. *Pachyptera, Lundia,* anthers pilose).

Leaves conjugate or ternate.

Calyx several cm. long, inflated, glabrate as corolla. 20. *Callichlamys.*

Calyx smaller, not or not obviously inflated, unless *Stizophyllum*.

Corolla elongate-subhypocrateriform, glabrous below, 8–16 cm. long; nodal glands none or some; capsule oblong-ellipsoid, ligneous, smooth. 14. *Tanaecium*.

Corolla funnelform, at most about 8 cm. long.

Inflorescence short, rather dense or flowers few; leaves rather pellucid-punctate; capsules smooth.

Flowers glabrous; nodal glands; tendrils uncately trifid.....30. *Macfadyena*.

Flowers pubescent; glands obsolete; tendrils not uncate.....19. *Stizophyllum*.

Inflorescence long or open; corolla pubescent; leaves obscurely or not pellucid.

Nodal glands; calyx glands none; capsule tuberculate.....27. *Xylophragma*.

Nodal glands none; calyx glands; capsule (known, Peru) smooth or rugulose, oblong; part.....4. *Adenocalymma*.

Leaves unless uppermost pinnate or bipinnate; nodal glands none; corolla glabrous.

Branches terete or subterete or deciduously ribbed; calyx 12 mm. long or longer.....28. *Memora*.

Branches acutely quadrate; calyx to 9 mm. long. 29. *Pleonotoma*.

Corolla red or orange-red, tubular-funnelform; stamens more or less exserted.

Leaflets acute or rounded at base; corolla, anthers glabrous.

Stamens visible between the early imbricate corolla lobes; stipules foliaceous...15. *Macranthosiphon*.

Stamens extended above the apically imbricate corolla; stipules obscure.....21. *Pyrostegia*.

Leaflets cordate; corolla, anthers pubescent; one aberrant species.....22. *Lundia*.

Corolla not at all or only partly yellow, never orange-red; stamens included (*Martinella*, tendrils early uncate-trifid).

Anthers glabrous; calyx various but not entire or truncate-denticulate after anthesis.

Corolla glabrous; nodal glands usually none.

Racemes lax, rarely branched; disk obvious.

Calyx 3-lobed; capsule smooth....10. *Martinella.*

Calyx cleft, early denticulate; capsule echinate; part.....8. *Clytostoma.*

Cymes 2–3-branched; calyx cleft, apex calloused; disk obsolete; capsule asperous. 25. *Phryganocydia.*

Corolla pubescent; disk developed; capsule more or less tuberculate-echinate; flowers few.

Calyx baccate, membranous; nodal glands obvious; capsule narrow; pollen?.....9. *Scobinaria.*

Calyx dull, firm or soft, canescent or yellowish; pollen monads; capsule broad.....27. *Xylophragma.*

Anthers glabrous; calyx entire or dentate, then evenly; corolla puberulent; nodal glands often obvious; capsule smooth; flowers usually crowded..1. *Arrabidaea.*

Anthers pilose; calyx thin-margined; nodal glands obvious.

Stipules obscure; corolla yellowish-white, broadly funnelform above short tube, lobes eglandular; part. 22. *Lundia.*

Stipules seriate; corolla purple or white, narrowly funnelform above long tube, seriate-glandular. 5. *Pachyptera.*

Trees, shrubs (except *Campsis*); capsule loculicidal or fruit indehiscent.

Leaves bipinnate; fruit disklike or ellipsoid; staminode elongate.....32. *Jacaranda.*

Leaves pinnate at least in part, if leaflets only 3 the middle one largest; staminode short.....34. *Campsis,* 35. *Tecoma.*

Leaves palmately divided or simple; staminode short.

Flowers yellow or green; alate seeds entire.

Capsules smooth; flowers yellow.....36. *Tabebuia.*

Capsules costate; flowers green, yellow or orange.

Stamens glabrous; flowers green (Peru)..37. *Cybistax.*

Stamens pilose; flowers orange, yellow-spotted.
38. *Godmania.*

Flowers white or tinted; seed wing lacerate.
39. *Sparattosperma.*

Leaves all simple (Peru).

Flowers red-purple, long-tubular; fruit valves more or less excavated.....40. *Delostoma.*

Flowers small, to 1 cm. long; fruit indehiscent.

Calyx truncate or lobulate; leaves decussate; scandent by rootlets .....41. *Schlegelia.*

Calyx 1–2-parted; leaves spiralled; erect..42. *Crescentia.*

1. ARRABIDAEA DC.

Scandent (Peru), the terete or subterete branchlets striate or sulcate, always or usually(?) glandular at or near the nodes. Leaves tri- or bi-foliolate (sometimes simply ternate), the tendril commonly developed, simple; pseudostipule none or minute. Inflorescence ordinarily ample, lax, much branched, rarely reduced to one or two axillary flowers, these often small, campanulate to funnelform, densely pubescent. Calyx obconic or tubular-campanulate, truncate, denticulate. Disk pulvinate, annulate or cupulate. Anthers glabrous, cells somewhat to strongly divaricate. Ovary lepidote, ovules 2– (rarely 4–) seriate. Capsule linear, compressed, valves parallel, smooth, medial nerve strongly developed, the oblong seeds hyaline-alate.

KEY (after Bureau & Schumann)

Ovules biseriate per cell.

Ovules not more than 5; flowers small, to 1.5 cm. long.
A. platyphylla.

Ovules more than 10; flowers larger, except *A. divaricata.*

Adult foliage and branches glabrous or glabrate (see *A. corallina*), sometimes pale-lepidote beneath.

Leaves more or less concolor, not biternate.

Flowers precocious, rather closely disposed.
A. Schumanniana.

Flowers typically in ample panicles.

Corolla 3–4 cm. long, calyx 4 mm. long...*A. brachypoda.*

Corolla 10 mm. long, calyx 2 mm. long....*A. divaricata.*

Corolla 14–16 mm. long, calyx 4 mm. long....*A. florida.*

Flowers pseudospicate.....*A. spicata.*

Leaves more or less pallid-lepidote beneath or lower biternate.

Leaves in part conjugate, leaflets 5-nerved; stipules obscure. *A. quinquenervia.*

Leaves ternate, lower biternate, leaflets many-nerved; stipules seriate.....*A. bracteolata.*

Adult foliage with some simple or branched trichomes.

Leaves concolor; inflorescence often lateral.....*A. corallina.*

Leaves discolor, paler beneath; inflorescence usually terminal.

Leaves white beneath.....*A. Orbignyana.*

Leaves greenish-white beneath.....*A. tuberculata.*

Ovules 4-seriate.

Leaves ternate.

Calyx about 5 mm. long, campanulate; leaves glabrate in age. *A. rubrinervis.*

Calyx 4–8 mm. long, narrow; leaves (types) pubescent beneath.

Calyx teeth minute.....*A. Pearcei, A. Weberbaueri.*

Calyx teeth obvious.....*A. cinnamomea.*

Leaves, unless uppermost, biternate.....*A. inaequalis.*

VEGETATIVE KEY

Flowers to about 1.5 cm. long; leaves in part simple and conjugate; trichomes more or less obvious.

Leaf nerves opposite or nearly from base; capsules often 1.5 dm. long; flowers corymbose.

Leaflets acuminate; calyx 2, corolla 10 mm. long..*A. divaricata.*

Leaflets obtuse or obtusely cuspidate; calyx 4, corolla to 16 mm. long.....*A. florida.*

Leaf nerves 3–5 from base, upper subopposite; capsules to 1 dm. long; flowers subspiciform.....*A. platyphylla.*

Flowers 2–5 cm. long or longer; leaves (lower) ternate or biternate, upper conjugate.

Leaf nerves 3–5 from near or at base, stronger than upper, all ascending.

Leaves even in age more or less canescent beneath. *A. quinquenervia, A. Orbignyana.*

Leaves green or greenish beneath, glabrate or glabrous unless nerves.....*A. tuberculata, A. brachypoda.*

Leaf nerves all subopposite, subequal, arcuate-spreading.

Inflorescence short, paniculate or subumbellate.

A. Schumanniana.

Inflorescence more or less openly paniculate; flowers 2.5–5 cm. long.

Panicles in flower canescent; corolla to 3 cm. long; dried leaves reddish-brown or tomentose.

Leaves conjugate or ternate.

Leaves glabrate; anther cells parallel.....*A. rubrinervis.*

Leaves tomentulose; anther cells arcuate.

A. Weberbaueri, A. Pearcei.

Leaves, except uppermost, biternate.....*A. inaequalis.*

Panicles glabrous or nearly; flowers 4–5 cm. long; dried leaves green or dark.

Sepals seriate; dried green leaves and crowded flowers castaneous.....*A. bracteolata.*

Sepals not seriate; leaves, at least younger, dark; flowers lax, often precocious..*A. Schumanniana, A. corallina.*

Panicles rusty tomentose; corolla 3 cm. long; dried leaves dark brown.....*A. cinnamomea.*

Inflorescence spiciform-paniculate; flowers 2.5–3 cm. long.

A. spicata.

Arrabidaea bracteolata (DC.) Sandw. Recueil Trav. Bot. Néerl. 34: 215. 1937. *Bignonia bracteolata* DC. Prodr. 9: 157. 1845. *A. biternata* Huber, Bol. Mus. Paraense 4: 607. 1906, fide Sandwith, Kew Bull. 1953: 459. 1954.

Well-marked by the biternate leaves (uppermost often simply ternate), flaky corky covering of the branchlets, petioles and petiolules, acutely acuminate seriate stipules, oblong-elliptic long-attenuate thin leaflets (many main lateral nerves) with plate-shaped glands near midrib beneath; the small tomentulose calyx often with longitudinal gland-areas, the corolla narrowly funnelform.—After Sandwith, who notes also that there is a curious superficial resemblance to *Pachyptera kerere* (Aublet) Sandw.; the fruit is unknown.—Corolla white, lilac-tinged or clear lilac (Schunke); used for lashings, the native name meaning "poor youth." Determinations by Sandwith.

Leaflets in Brazilian type 1 dm. long, a fourth as wide, rigid, reticulate-veined both sides; panicles axillary and terminal, congested, bracts acuminate, corolla 5 cm. long; fide Huber, panicles ferruginous tomentulose, pedicels 5–7 mm. long, calyx 5 mm. long, eglandular, corolla white, glabrous except lobes, 5.5 cm. long.

Loreto: Sarayacu, Río Ucayali, Pampa del Sacramento, (*Huber 1495*, type, *A.* (?) *biternata*). Itaya near Iquitos, *Asplund 14307; Mexia 6479* (det. Standley, *Adenocalymma* spec. nov. ined.). Río Mazán, *José Schunke 230; 48.* Mishuyacu, *Klug 903.* Río Ucayali, *Seibert 1892.* Colombia; Brazil. "Huacchamosa" (Mexia).

Arrabidaea brachypoda (DC.) Bur. Vidensk. Meddels. Naturh. Foren. 98, 1213. 1893. *Bignonia brachypoda* DC. Prodr. 9: 145. 1845. *A. platyphylla* (Cham.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 38. 1896, not DC. l.c. 186, fide Sandwith. *Bignonia platyphylla* Cham. in Linnaea 679. 1837.

Stems early puberulent as nerves of the often simple or conjugate leaves beneath, the leaflets finely reticulate both sides, obovate or oblong-elliptic, acute or rounded, often about a dm. long, half as wide, also larger or smaller, finally glabrate, more or less lepidote, pubescence varying beneath as also on the terminal or axillary pyramidal panicles; bracts scarcely 2 mm. long, pedicels 2–7 mm. long; calyx truncate, obscurely dentate (4) 6–7 mm. long, glandular; corolla violet or roseate, 2.5–3.5 cm. long, softly puberulent as lobes within; capsules linear, 1.5–2 dm. long, 12–14 mm. wide, seeds 3 cm. long, 11 or 12 mm. wide, wing gradually extended.—Very different from *A. platyphylla* DC. (Sandwith). *A. tuberculata* P. DC. ex char. has the principal leaf nerves puberulent as the somewhat smaller calyx; scarcely significant differences, rather probably usual variations. The Killip and Smith collections were referred by Killip to *A. Orbignyana*, perhaps correctly another glabrate form. Type, Silva Manso, Cuyaba, Mato Grosso. Seibert plant decumbent, clearing edge, flowers lavender.

San Martín: Moyobamba, *Osgood & Anderson 39; 40.* Tarapoto, *Spruce 3968.*—Junín: Vitoc, 13 km. from San Ramón, *Soukup 2454* (det. Sandwith). Colonia Perené, *Killip & Smith 25008; 25135.* San Ramón, *Killip & Smith 24801.*—Loreto: Yurimaguas, *Killip & Smith 27940; 28174; 28324.*—Cuzco: Santa Ana, *Cook & Gilbert 1420.* —Madre de Díos: Río Acre drainage, *Seibert 2050* (det. Sandwith). Iberia, Maldonado, Riberalta, *Seibert 1951; 2007; 2108* (all det. collector *A. platyphylla* of Bur. & Sch.). Bolivia; Brazil.

Arrabidaea cinnamomea (DC.) Sandw. Candollea 7: 248. 1936. *Bignonia cinnamomea* DC. Prodr. 9: 164. 1845.

Terete younger branches, petioles (to 7.5 cm. long), leaves beneath, peduncles and calyces densely pubescent with reddish-brown stellate trichomes (type); leaflets broadly ovate, subcordate, the lateral obliquely, all shortly acuminate, reticulate-veined, 1.5 dm. long, about half as wide, sparsely and minutely stellulate-scabrous above; calyx oblong-cylindric, plicately nerved toward tip, denticulate, 8 mm. long; corolla tubular, appressed velutinous.—After DeCandolle; in Klug material calyx 8–11 mm. long, teeth rather prominent, one usually longer. Sandwith noted glands near nodes, inflorescence terminal, pyramidal, densely flowered. Not placed by Schumann in Mart. Fl. Bras. l.c. 285. Type, Serra da Cuyaba, Mato Grosso; the Peruvian specimens (also one from Goyaz) have leaflets more glabrate beneath but are closely allied or seem conspecific, the type remarkable for brown tomentum of branched trichomes; stem 6 cm. thick (Tessmann); flowers lilac (Klug.)

Loreto: Balsapuerto, *Klug 2871* (det. Sandwith). Yarina Cocha, middle Ucayali, *Tessmann 3484* (as to leaves; det. Sandwith, *A. Weberbaueri*). Brazil.

Arrabidaea corallina (Jacq.) Sandw. Kew Bull. 1953: 460. 1954. *Bignonia corallina* Jacq. Fragm. Bot. 37: *pl. 42, fig. 1.* 1800–1809. *B. boliviana* Rusby, Bull. Torrey Club 27: 70. 1900, fide Sandwith, l.c. 430. 1959. *A. obliqua* (HBK.) Bur. Vidensk. Meddels. Naturh. Foren. 99. 1893, fide Sandwith, l.c. 460. *B. obliqua* HBK. Nov. Gen. & Sp. 3: 135. 1819.

Usually more or less tomentulose and long-villous, at least the younger leaves, sometimes merely puberulent or even glabrous unless the yellow corolla in part, this 4.5–5 cm. long, lobes about 1 cm. long; leaflets broadly ovate to suborbicular, 5–10 cm. long, often much more than half as wide, rounded truncate or subcordate, obtuse or obtusely cuspidate, finally coriaceous, concolor, usually distinctly reticulate-veined beneath; panicles 1–2 dm. long; pedicels with peduncles 8–15 mm. long, the former slender; calyx campanulate, truncate or dentate, glandular pubescent below; corolla 5 cm. long, papillose at stamen-insertion, tube otherwise glabrous, limb rigidly pilose; disk pulvinate; ovules 20 per cell, biseriate; capsule linear, acute to acuminate, early puberulent, valves impressed-punctulate.—Leaflets vary in acumination and abundance of long trichomes; the inflorescence is often lateral from leafless old wood (Sandwith); the ex-

tremes in development of pubescence have been indicated, under one or another specific name as var. *glabra* or var. *hirsuta*, following DeCandolle for his *Bignonia Balbisiana*, Prodr. 9: 153. 1845, a Colombian form now apparently correctly interpreted as a part of *A. corallina*. Since it has been collected at Ríos Beni and Madre de Díos in Bolivia this species will doubtless be found within adjacent Peru as have so many others from this watershed.

Madre de Díos: Iberia, *Seibert 2159; 2169* (det. Sandwith). Paraguay and Bolivia to Colombia; Venezuela.

Arrabidaea divaricata Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 33. 1896.

Similar and closely allied to *A. florida* P. DC. but apparently differs constantly in the somewhat narrower mostly long-acuminate leaflets, minutely hirtellous slenderly branched panicles, the smaller (2 mm. long) calyx and at most, 1 cm. long corolla.—Capsule of type 11–18 cm. long, 8–9 mm. broad, suboleaceous, the seeds 2.5 cm. long, 6–7 mm. broad, wing brilliantly white. F.M. Neg. 32854.

San Martín: Tarapoto, *Spruce 4410*, type; *Woytkowski 35088* (det. Cuatrecasas). Juanjuí, *Klug 4246* (det. Standley, *A. florida*). —Huánuco: Tingo María, *Allard 22413* (det. L. B. Smith).—Loreto: Río Paranapura, *Klug 3928* (det. Standley, *A. florida*). Balsapuerto, *Klug 2897* (det. Standley, *Tynnanthus myrianthus?*). Brazil.

Arrabidaea florida P. DC. Prodr. 9: 184. 1845.

Resembles *A. divaricata* but glabrous except the more or less lepidote branchlets, petioles, leaves and capsules and the yellowish-puberulent many-flowered densely corymbose inflorescence; leaflets rather firm or subcoriaceous, reticulation beneath not conspicuous; corolla lilac, rather pink or creamy white, usually 1.5, at most 2 cm. long; capsule to 1.5 dm. long.—Leaflets subobtuse or shortly and obtusely acuminate; panicle branches rather stout; calyx 4 mm. long —these being the principal contrasting characters. In both species the dried leaves are castaneous or ferrugineous green.

San Martín: Tarapoto, *Spruce 4210; Woytkowski 35045* (det. Cuatrecasas). Juanjuí, *Klug 4257* (det. Standley). Chazuta, *Klug 4020* (det. Standley).—Loreto: Yurimaguas, *Poeppig 2393* (det. Schumann). Mishuyacu, *Klug 951* (det. Sandwith). Río Zubineta, *Klug 2036* (det. Standley). Balsapuerto, *Klug 2975* (det. Standley).— Cuzco: Cosñipata, 800 meters, *Weberbauer 6945*. Paraguay; Bolivia to Panama; Guiana.

Arrabidaea inaequalis (P. DC.) Baillon, Hist. Pl. 10: 28. 1891; 74. *Bignonia inaequalis* P. DC. Prodr. 9: 170. 1845. *Tetrastichella inaequalis* (P. DC.) Pichon, Bull. Soc. Bot. France, 92: 223. 1945.

Apparently now as originally unique in the triternate leaves, except the uppermost; branchlets terete, finely striate, the glandular areas dense, tendrils often many, white; leaflets drying dark brown or purplish black, ovate- or obovate-oblong, to 1 dm. long, 7 cm. wide, often obliquely rounded at base, cuspidate or acuminate, chartaceous, usually lustrous, laxly reticulate-veined both sides, sometimes puberulent on nerves as the elongate inflorescences (unless central rachis), but including the oblongish calyces, these truncate, denticulate, 4–6 mm. long, and the pink purple corollas, these about 3 cm. long, the indument dense, the limb pubescent within, about 2 cm. across; ovary densely glandular-lepidote, ovules 4-seriate; capsule to 2 dm. long or longer, 1 cm. broad, glabrous but minutely lepidote and with scattered plate-shaped glands (Sandwith).—Schumann included this in his section *Paracarpaea* (ovules 4-seriate), which Pichon, l.c. raised to generic rank but eliminated this species; all these have the 3-sulcate pollen of most other species. Illustrated, Mart. Fl. Bras. 8, pt. 2: *pl. 77*.

Peru (probably). Amazonian Brazil to Trinidad.

Arrabidaea Orbignyana P. DC. Prodr. 9: 184. 1845. *A. pachycalyx* Sprague, Bull. Herb. Boiss. ser. 2, 6: 373. 1906? *A. candicans* (Rich.) DC. l.c. 185, as to western watershed?

Doubtfully distinct genetically from the similar plant (*A. candicans*) of the Amazonian basin but the broader (to 7 or 8 cm.) leaflets granular-puberulent above and not or less white pubescent beneath; it is possible that this taxon is not more than a geographic form or subspecies of *A. candicans* (Sandwith, Kew Bull. 428–429. 1958). Leaflets in Bolivian type velvety canescent beneath, nearly 1 dm. long, half as wide, corolla (apparently purple) 16–18 mm. long (to 2.5 cm. long in Sprague's plant, its leaves opaque above, glabrate, canescent beneath); *A. candicans* has leaves lustrous, glabrous above, densely fine-tomentose beneath, corolla about 2 cm. long (see note by I. M. Johnston under *A. tuberculata*).—Apparently one time collected within Peru, but it almost certainly will be in Madre de Díos or other eastern areas. F.M. Neg. 39955.

Loreto: Cumaria, upper Ucayali, *Tessmann 3331*. Bolivia to Central America.

Arrabidaea Pearcei (Rusby) Schum. ex Urban, Repert. Sp. Nov. 14: 302. 1914. *Bignonia Pearcei* Rusby, Mem. Torrey Bot. Club 6: 100. 1906.

Ferrugineous-hirsute or tomentose all over; branchlets short, very stout, terete, light brown; leaflets 3, ovate to rotund-ovate, very oblique and subcordate at base, 1–1.5 dm. long, 5–10 cm. wide, rigid-membranous, sparsely pubescent above, densely beneath, the 5 pairs of primary nerves as the veins prominent; panicles short, broad, stoutly peduncled, many-flowered, pedicels 3–5 mm. long; disk cupulate; bud obovoid, subacute or rounded; corolla 2–5 cm. long, apex 1.5 cm. across, bright purple, puberulent outside; stamens about as long as tube, linear anther cells divaricate.—Near *B. Sieberi* (author); type, *Bang 1391*, between Guanai and Tipuani, Bolivia.

Ica(?): Pala (*Pearce*). Bolivia; Trinidad?

Arrabidaea platyphylla DC. Prodr. 9: 186. 1845. *A. macrophylla* Schum. in Mart. Fl. Bras. 12, pt. 2: 25. 1896. *A. elliptica* Bur. & Sch. l.c. 26. *A. Bangii* Sprague, Bull. Herb. Boiss. ser. 2, 6: 371. 1906, both fide Sandwith, Kew Bull. 1958: 429. 1959.

Climbing by tendrils when finding support, the leaves simple and 2–3-foliolate, the leaflets suborbicular to obovate and oblong-elliptic, obtuse to acuminate, 1–2 dm. long, about half to three-fourths as wide, rounded to cuneate at base, reticulate and pilose (rarely only lepidote) especially beneath, less so above where sometimes rugose-bullate; panicles terminal, pyramidal, often ample, the many reddish purple flowers in several branches and innumerable branchlets, these more or less pulverulent-tomentulose as the calyces, the latter about 2.5–4 mm. long, glandular, minutely to distinctly denticulate; corolla subtomentose, usually at most 1.5 cm. long, tube little ampliate even to the ordinarily subequal lobes; disk more or less developed; anther connective glabrous or puberulous; capsule linear-oblong, acuminate at both ends, 8–16 cm. long, 9–13 mm. wide, densely lepidote, also with many scurfy furcate trichomes, valve margins incrassate, midrib very thin, even subobsolete; seeds oblong, body dark gray-brown, the broad membranous wings whitish-hyaline (fruit described by Sandwith from Seibert collections; otherwise description compiled to include the synonyms).—Type collected with *A. brachypoda* (DC.) with, ex char., simple leaves, pilose beneath, 3–5-nerved from base, oblong calyx minutely dentate, corolla scarcely twice longer (4–6 mm., probably an error for 14–16 mm.). *A. Bangii* is a form with leaflets densely lepidote beneath, trichomes none, *A. elliptica* another form

with acuminate leaflets, according to Sandwith, who also reduces Kränzlin's *A. syringothyrsus* of Brazil (corolla lobes unequal, lower cleft) with a remark questioning that student's judgments (unless in Orchids?); this widely distributed species is highly variable; see also *A. brachypoda*. The description is compiled to include some of these variants. Illustrated, F.M. Neg. 32856 (*A. elliptica*); Mart. Fl. Bras. l.c. *pl. 71* (*A. macrophylla*).

Madre de Díos: Río Tahuamanu, Iberia, *Seibert 1989; 2020; 2153* (det. Sandwith). Paraguay and Bolivia to British Guiana.

Arrabidaea quinquenervia Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 44. 1896.

Branches slender, the terete older notably striate, lenticellate, the younger lepidote and sparsely puberulent-hirtellous; petioles canaliculate, often flexuose; tendrils caducous; leaflets ovate or broadly elliptic, acutely 5-nerved from acute base, shortly and obtusely acuminate, mucronulate, 5–12 cm. long, 3–10 cm. wide, glabrous above, beneath under lens cinereous-lepidote, not at all glandular, coriaceous, the transverse veins as nerves prominent; panicle terminal, 1.5–2 dm. long, with elongate divaricate branches from axils of upper leaves, the bracts and branchlets minute; pedicels 2–4 mm. long; calyx tubular-campanulate, repand-denticulate, lepidote glandular, membranous; corolla elongate-funnelform, about 3.5 cm. long, puberulent-tomentose as lobes within, these 9–11 mm. long; disk thin, cupulate-truncate; ovary 2–3 cm. long, lepidote, ovules biseriate, 40 or more per cell.—Stipules obscure; distinctive in the acutely 5-nerved rounded leaves, peculiarly lepidote-cinereous beneath (authors); probably a part of *A. Orbignyana* and thus of *A. candicans* sens. lat. F.M. Neg. 32852.

Huánuco: Tocache, *Poeppig 1877*, type.

Arrabidaea rubrinervis Miers, Proc. Roy. Hort. Soc. 3: 192. 1863. *A. subfastigiata* Bur. in Mart. Fl. Bras. 8, pt. 2: 70. 1896, fide Sprague. *A. macrocarpa* Ktze. Rev. Gen. 3, pt. 2: 242. 1898, fide Sandwith. *Blepharitheca floribunda* (DC.) Pichon, Bull. Soc. Bot. France, 92: 224. 1946.

Vigorous, becoming nervose-lenticellate, glabrescent or glabrous, early subtomentulose; leaves ternate or conjugate and the tendrils sometimes persisting; leaflets ovate-oblong, 4–9 cm. long, 3–6 cm. wide, shortly or long and obtusely acuminate, firm herbaceous, obscurely puberulent and lepidote, drying pale ashy red, rarely greenish; panicles terminal (always?), canescent-puberulent or glabrate, to

2.5 dm. long, bracts and bractlets to 2 mm. long; pedicels usually shorter than 5 mm.; calyx campanulate, evenly denticulate, puberulent, about 5 mm. long; corolla roseate, 2.5 (–4) cm. long (tube 28 mm. long, type), obscurely tomentose, pubescent within near stamen insertion; anther cells ciliate, medially fertile; disk cupulate; ovary lepidote, ovules 4-seriate; capsules glabrous, 2.5–4 dm. long to 1 cm. broad, valves medially sulcate, the seeds uniseriate, white alate.—May be a part of *A. chica* (HBK.) Verlot, Colombian as to type, but that is said to have leaflets drying black-purple, flowers roseate or pale purple with white throat; however, Bureau and Schumann included Miers' plant here. This dries brownish-red, not greenish-brown as the sometimes simulating *A. brachypoda* (DC.) Bur. The genus of Pichon, l.c. has tetrad pollen, not sulcate grains, the anthers ciliate; the taxonomic importance of these characters merits study. Illustrated, Delessert, Icon. 5: *pl. 92* (*A. chica* Verlot as *A. rosea* DC.).

San Martín: Tarapoto, *Spruce 4925*, fide Schumann, *A. chica* (HBK.). Arroyo Bravo, *Allard 21770*. Chazuta, *Klug 4046?*—Huánuco: Cuchero, *Poeppig*.—Junín: Vitoc, (*McLean*, det. Sandwith). Toward Satipo, *Seibert 2377* (det. Sandwith). Monterico, (*Pearce*, det. Sandwith).—Loreto: Iquitos, *Killip & Smith 27379*.—Madre de Díos: Iberia, *Seibert 1993* (det. Sandwith). Bolivia; southern Brazil.

Arrabidaea Schumanniana Huber, Bol. Mus. Goeldi 4: 606. 1906.

Glabrous except flowers, the branches obtusely tetragonous, leaves ternate or conjugate, the simple tendril persisting; leaflets lanceolate or oblong-lanceolate, obtusely acuminate, 8–15 cm. long, 3–6 cm. wide, olivaceous above (dried), paler beneath; inflorescence precocious or shortly paniculate or pseudoumbellate on older branches, the bracts and bractlets subpersisting, elongate, acute, to 7 mm. long, the common peduncle 1–2.5 cm. long, bracted below; pedicels slender, 1.5–2 cm. long; calyx campanulate, 5 mm. long, densely minutely glandular especially below the teeth; corolla roseate, 4–5 cm. long, tube elongate-funnelform, the lobes rounded, puberulent without, at stamen insertion within pubescent; disk subcupulate; ovary lepidote; ovules biseriate; capsules about 21 cm. long, 11–12 mm. broad, marginally lightly incrassate; seeds 14 mm. long, 9 mm. wide, alate.—Affine the Brazilian *A. rhodantha* Bur. & Sch., also distinguished by the rose-colored flowers in short leafless inflo-

rescences (author), but this apparently less lepidote, calyx much shorter. It probably is a part of *A. corallina* (Jacq.) Sandw.

Loreto: Canchahuaya, on the Río Ucayali, (*Huber 1387*, type).

Arrabidaea spicata Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 42. 1896. *A. candelabrum* Kränzl. Repert. Sp. Nov. 17: 18. 1921, at least as to Spruce specimen.

Glabrous except the unusual spiciform panicles and the slender branches, these early and obscurely pulverulent; upper leaves much smaller than lower, ternate, the conjugate larger with stout simple tendrils, leaflets of the former oblong, acute or subobtuse, 2.5–4.5 cm. long, about 1–2.5 cm. wide, sparsely lepidote, the longer to 13 cm. long, half as wide, ovate, acute, cordate at base, subrigid-coriaceous, lustrous, drying ashy green, rather prominently 5-nerved both sides, the transverse veins reticulate; bracts and bractlets minute, caducous; pedicels 3–4.5 mm. long, subtomentose as the campanulate calyces, these lepidote below the minute teeth, truncate, 4–4.5 mm. long; corolla campanulate, laterally gibbous, 2.5 (3) cm. long, tomentose or puberulent, strongly enlarged and puberulent at the stamen insertion; disk cupulate; ovary lepidote, biseriate ovules many.—Flowers violet, fasciculate in bracteate axils as in Labiatae and thus easily recognized (authors). F.M. Negs. 26168; 32851.

San Martín: Near Tarapoto, *Spruce 4535*, type. Chazuta, *Klug 4061*. Brazil?

Arrabidaea tuberculata P. DC. Prodr. 9: 184. 1845.

Liana, the terete lenticellate young branchlets (nodal glands usually obvious), petioles and immature leaves more or less finely and densely puberulous, glabrate in age except often the principal nerves beneath, these also barbellate in the axils, the venation finally intricately reticulate, the surface not punctate; leaflets ovate- or oblong-lanceolate, rounded or cuneate at base, notably acuminate, to 13.5 cm. long, 6.5 cm. wide, discolored, chartaceous; thyrses showy, pyramidal, the cymes shortly pedunculate along the ascending closely puberulous branches; calyx campanulate, truncate, 3.5–5 mm. long, puberulous-tomentulose, now and then with a few patulous submarginal glands; corolla reddish-purple, subfunnelform, normally 2–3 cm. long, limb 1–2.5 cm. across, pubescent within; disk cupulate; capsule at least 2 cm. long, 7.5–8.5 cm. broad, sharply acuminate, glabrous but with many deeply set glands, the midrib sharply raised.

—After Sandwith; related species of wide range and to be expected include *A. candicans* (L. C. Rich.) DC. (leaflets glabrous above except nerves, a compact fine indument beneath; Johnston, Sargentia 8: 269. 1949); *A. pachycalyx* Sprague, i.e. *A. Orbignyana* DC., very closely allied, perhaps not distinct (Sandwith); and *A. florida* DC. A fine pale tomentum persists on the leaves beneath of the first, the capsules to 27 cm. long, attenuate, while the last has leaves glabrous beneath in age, lepidote-punctate, the capsules less than 2 dm. long, merely attenuate apically; corollas of these species attain about 2 cm. Illustrated, Mart. Fl. Bras. 8, pt. 2: *pl. 75*.

Huánuco: Pueblo Nuevo, *Ruiz & Pavón*, fide Schumann.—Loreto: Balsapuerto, *Klug 2973*. To Colombia and Guiana.

Arrabidaea Weberbaueri Sprague, Bot. Jahrb. 42: 175. 1908.

Branches subterete, minutely puberulent at the compressed nodes, interfoliar areas densely glandular; petioles as panicles (to 3 dm. long) pubescent, petiolules reddish tomentulose, 13–17 mm. long; leaflets broadly ovate or elliptic, rather rounded at base and apex or obtusely short-acuminate, 9–15 cm. long, 5.5–10.5 cm. wide, subcoriaceous, early softly puberulent above (nerves obscure), tomentulose beneath, the 6–7 pairs of lateral nerves prominent, veins little obvious; calyx narrow, denticulate, 4–5 mm. long, ribs little excurrent, tomentulose, pulverulent inside only above; corolla funnelform, in type 23–27 mm. long, roseate (or violet and white), lightly arcuate above the 6–8 mm. long tube, puberulent except near base, within only at subbasal stamen insertion and sparsely above, the trichomes capitate; lobes puberulent within, 6.5–7.5 mm. long, about as wide, subequal; ovary stipitate; ovules 4-seriate, about 40 per cell.—Differs from the velvety *A. rubrinervis* in indument and size of leaflets (author); these become glabrate above. Species well marked by its indument, narrowly tubular campanulate calyx, the ribs extended as teeth, narrow corolla, short arcuate anther cells, the much-produced connective apically retuse (Sandwith). *A. Pearcei* (Rusby) Schum. ex Urban, Repert. Sp. Nov. 14: 302. 1914 (*Bignonia Pearcei* Rusby, Mem. Torrey Bot. Club 6: 100. 1906) may be the earlier name but incompletely described; Pearce got it at Pala, perhaps Dept. Ica or Lima, but type by Bang (*1391*), adjacent Bolivia, near Tipuani. F.M. Neg. 26177.

San Martín: Juanjuí, *Klug 4179* (det. Sandwith). Lake Rikuricocha, *Woytkowski 35127* (det. Cuatrecasas, affine *A. florida*).—Junín: La Merced, *Weberbauer 1934*, type; 283. Colombia; Brazil.

2. PETASTOMA Miers

Resembles in general *Paragonia* but the tendrils if present simple, the stipules obsolete or falcately subfoliaceous. Thyrse sometimes axillary. Calyx patulous or campanulate, entire, denticulate or lobed, more or less membranous as the corolla, this with narrow often elongate tube, pubescent to tomentulose or quite glabrous, the lobes in bud notably tomentulose without. Disk pulvinate. Ovary glabrous or lepidote. Capsule smooth, midrib slightly raised.—This was included in *Arrabidaea* by Bureau and Schumann (Pflanzenfam.) but accepted by them (Mart. Fl. Bras., 8, pt. 2: 75–85), as here defined.

Corolla puberulent to glabrous, eglandular; calyx not 3-lobed.

Calyx patelliform, truncate, wavy-margined, glabrate; leaflets more or less pilosulous. . . . . *P. patelliferum.*

Calyx depressed-globose or -campanulate, minutely denticulate or lobulate; corolla tube included or somewhat exserted.

Calyx basally puberulent as leaflets beneath at least early on nerves. . . . . *P. Poeppigii.*

Calyx as leaves glabrous. . . . . *P. pentstemonoides.*

Corolla glandular-puberulent; calyx 3-lobed. . . . . *P. Whitei.*

Petastoma patelliferum (Schlecht.) Miers, Proc. Roy. Hort. Soc. 3: 195. 1863; 19. *Bignonia patellifera* Schlecht. Linnaea 8: 516. 1833. *Cuspidaria mollis* Kränzl. Notizbl. Bot. Gart. Berlin 6: 376. 1915 (fide Sandwith, forma dense pilosa).

Younger branchlets early compressed toward tips, costate, lepidote, lenticellate, infrequently somewhat pilose, the petioles, petiolules, leaflets and thyrse always more or less so; stipules usually undeveloped; leaflets subelliptic or obovate-oblong, narrowly rounded at base, acuminate or cuspidate, to 11 cm. long, 8 cm. wide, rather faintly reticulate-veined on both sides; calyx glabrate, red when fresh, truncate, unevenly wavy, often flattened outward, to 5 mm. long; corolla dark purple, white-tipped (always? Sandwith), 2.5–4 cm. long, the tube glabrous, the lobes pubescent without, the limb (2–2.5 cm. across) within; anthers divergent or arcuate-divaricate; ovary sparsely if at all lepidote; ovules 20 or more in each row; capsule 1.5–2 dm. long, to 1.25 cm. broad, glabrous, lenticellate; seeds 1 cm. long, about 3.5 cm. broad.—Material seen appears, ex char., to belong to other species; however, *P. patelliferum* sens. lat. may occur of course and indeed may rightly include species now regarded as

distinct. Illustrated, Oesterr. Bot. Zeitschr. 80. *pl. 1, figs. 8, 9* (flower).

Peru (fide Sandwith). To Mexico and French Guiana.

Petastoma pentstemonoides (Kränzl.) Sandw. Kew Bull. 43: 7. 1959. *Arrabidaea pentstemonoides* Kränzl. Notizbl. Bot. Gart. Berlin 6: 370. 1915.

Branchlets lightly sulcate, densely lenticellate; tendrils early caducous; leaflets ovate, obtusely acuminate, type to 1 dm. long, 6.5 cm. wide, coriaceous, the 5 principal nerves usually somewhat membranously joined; panicles (also terminal) more than 2.5 dm. long, pedicels 3–6 mm. long; calyx ellipsoid-campanulate, glabrous, membranous, (6) 11 mm. long, (3–4) 7 mm. wide, lobes 1–1.3 mm. long, broadly deltoid-acute; corolla (violet) scarcely to 3 cm. long, limb about 2 cm. across, cylindric portion of tube 7 mm. long, upper portion 1.5 cm. long, glabrous without (pulverulent), the lobes less than (6–7 mm.) 1 cm. long; anther cells curved-divergent, 2 mm. long; staminode 4.5 mm. long; ovary cylindric-oblong, lepidote, ovules about 20 in each series.—Description of flower from Schultes' collection, by Sandwith (parenthetical, from type), who notes, l.c.: closely related (large glabrous calyx) to the Brazilian *P. leucopogon* (Cham.) Bur. with a characteristic dense indument, the nearest ally, geographically. One of many examples of a Bolivian species found in Peru.

San Martín: Chazuta, *Klug 4098* (det. Standley, *P. patelliferum*). Zepelacio, *Klug 3631* (det. Standley, *P. reticulatum*).—Loreto: Río Putumayo, *Klug 2037* (distr. *P. reticulatum?*). Balsapuerto, *Klug 2989* (distr. *P. reticulatum?*). Río Napo, *Mexia 6466* (det. Standley, *P. patelliferum*).—Puno: Prov. Sandía, *W. H. Hodges 6007*.—Madre de Díos: Iberia, Inapari, *Schultes 6474*.—Río Acre: Cobija, *Ule 9780;* type. Bolivia. "Huachamosa?"

Petastoma Poeppigii (DC.) Sandw. Candollea 7: 249. 1937. *Anemopaegma*(?) *Poeppigii* DC. Prodr. 9: 190. 1845. *P. reticulatum* [Poeppig] Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 82. 1896.

Branches terete, striate, nodally dilated, early as petioles and peduncles finely velutinous pubescent; leaflets long-petiolulate, elliptic, obtuse at base, obtusely acuminate, about 7.5–11 cm. long, 3–6 cm. wide, membranous, glabrous above unless midnerve, puberulent-hirsutulous beneath and obsoletely puncticulate, concolor, the 5 nerves and transverse veins prominently reticulate; stipules rotund

or falcate, 6–15 mm. long, 2–12 mm. wide; panicles many-flowered, bracts filiform, caducous; calyx campanulate, unevenly lobulate-subtruncate, 6 mm. long, scarcely pubescent; corolla glabrescent (lobes pulverulent), purplish, about 4 cm. long (Schumann); anther cells recurved-erect; ovary sparsely lepidote, ovules 22, biseriate.—Sandwith's paper is a fine example of an unselfish contribution to taxonomic work. F.M. Neg. 32871; 7661.

Huánuco: Cuchero, and Pampayacu, *Poeppig 1683*, type.

Petastoma Whitei (Rusby) Sandw. Kew Bull. 1953: 462. 1954. *Anemopaegma Whitei* Rusby, Mem. N. Y. Bot. Gard. 7: 353. 1927.

Branchlets, new leaves all over and leaflets in age densely pilose beneath on nerves, particularly on midnerve; leaflets (type) to 8 cm. long, 4.5 cm. wide, broadly rounded or subtruncate at base, acutely short-acuminate, lateral nerves 6–8 pairs, slender; thyrses axillary, the rose-violet flowers beautiful; pedicels 2–3 mm. long; calyx thin-membranous, lax, 3-lobed (Rusby), plicate, 8–10 mm. long, the tube depressed-globose, 8 mm. wide (Rusby).—Indument of corolla consists entirely of gland-tipped trichomes, the entire length without (Sandwith) the tube (type) 5 mm. long, the expanded part campanulate, about 2 cm. long to the base of the lobes (Rusby); ovules in each of the 2 series according to Sandwith (as description in part), who contrasts it by the larger, lobed not disk-like calyx, corolla indument, more ovules, with the well-named *P. discocalyx* Bur. & Sch. O. E. White was an energetic member of the Mulford Expedition to Bolivia (Rusby). Type from Huachi, at bend of Río Beni and therefore species to be expected in southeastern Peru.

Peru (see above). Bolivia.

3. PSEUDOCALYMMA A. Sampaio & Kuhlmann

Similar in general to *Petastoma* and *Paragonia* but with conspicuous areas of immersed glands at nodes and usually at apex of petioles. Leaves bifoliate, the tendril if present trifid (always? Sandwith). Inflorescence an axillary raceme or thyrse, with conspicuously flattened rachis. Bracts and bractlets subulate (in Peru caducous?). Calyx without large plate-shaped glands. Corolla lilac or purple, funnelform, tube glabrous (or early minutely lepidote), limb as in *Petastoma*. Disk annular or pulvinate. Ovary, capsule and seeds as in *Arrabidaea*.—See Sandwith, Meded. Bot. Mus. Rijks. Univ. Utrecht 40: 208–213. 1937, for definitive disposition of this group and *Adenocalymma* Mart. Seibert, Mo. Bot. Gard. 35: 123–136.

1948, attributed the petiolar glands only to this genus and *Pachyptera* DC. Herbarium leaves brown. Pollen 3-sulcate, reticulate.

Pseudocalymma alliaceum (Lam.) Sandw. Recueil Trav. Bot. Néerl. 34: 210. 1937. *Bignonia alliacea* Lam. Encycl. 1: 421. 1785. *P. pachypus* (Schum.) Sandw. l.c. 211, fide Sandwith, Kew Bull. 1953: 467. 1954. *Anemopaegma pachypus* Schum. Pflanzenfam. 4. 3b: 215. 1894. *Adenocalymma pachypus* (Schum.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 110. 1896.

Garlic-scented liana with terete (drying yellowish-gray) finely costulate branchlets; leaflets elliptic to obovate or oblanceolate, acutely long-cuneate to the apically as basally swollen petiolules, acutely cuspidate-acuminate, at least 2 dm. long, 8 cm. wide, papery, drying green, pale beneath, not obviously punctate, obscurely 3-nerved at base, the 10 lateral nerves and reticulations rather prominent; inflorescence (var. *macrocalyx*) a long thyrse with a few long 3-flowered branchlets; rachis as pedicels (about 1.5–4.5 cm. long) strongly compressed, glabrate or minutely puberulent and lepidote, 3 dm. long or longer, the elongate branches terminating in a simple 3-flowered cyme; calyx laxly campanulate, early membranous, 1–2 cm. long, to 2 cm. across at the uneven frilly margin (var. *macrocalyx;* or 4–7.5 mm. long, dried, var. *microcalyx*), venose, punctate-lepidote or verruculose, rarely with an odd immersed gland; corolla lilac (Klug), about 5 cm. long, tube thin-membranous, limb pubescent and somewhat ciliate, lobes without rows of distinct glands; disk fleshy, annular; capsule to 4 dm. long, 1.1–2.1 cm. broad, much compressed.—After Sandwith, who describes inflorescence from similar material of British Guiana and Peru "which may well be conspecific;" probably it is the plant of Lamarck (type, French Guiana); in Kew Bull. l.c. 467, 468 he proposed as typical, var. *macrocalyx* (Lam.) Sandw., and as aberrant, var. *microcalyx* Sandw. Illustrated, Oesterr. Bot. Zeitschr. 80. *pl. 1* (stamen, staminode).

San Martín: *Klug 4138* (var. *macrocalyx*). Tarapoto, *Spruce 4475* (var. *microcalyx*).—Loreto: Balsapuerto, *Klug 3096* (var. *macrocalyx*). Río Mazán, *Schunke 48*. Mishuyacu, *Klug 777*. Iquitos, *Mexia 6417*. Boqueron Padre Abad, *Woytkowski 34473* (var.). To Mexico and the Guianas. "Sucho-ajo," "ajo-sacha."

4. ADENOCALYMMA Mart.

Scandent, the tendrils trifid (in Peru usually simple), the leaves, unless the uppermost, bi- or trifoliolate, the terete branches without

nodal gland areas. Stipules subulate or obsolete. Inflorescence a narrow axillary raceme or thyrse. Bracts usually conspicuous. Calyx campanulate, truncate, more or less lobed or denticulate or, if tubular, split. Corolla yellow, white or pink (not in Peru?), funnelform, more or less pubescent or glabrous without, sometimes black glandular. Anthers glabrous, connective not or not much produced, the cells spreading. Disk pulvinate-cupulate, prominent. Ovary lepidote or glabrous (ovules biseriate), oblong as the thick capsule, this with parallel ligneous valves, smooth, the midnerve often obscure. Seeds subtrapezoid, subcircular or oblong, usually alate with membranous hyaline or corky wings, the nucleus always very thick.—After Sandwith, Fl. Suriname 4, pt. 2: 55. 1938, as most descriptions; see discussion, as noted under *Pseudocalymma*. Pollen globose, esulcate. Leaflets often lead-colored, thicker margins pale in *A. impressum;* green-colored, *A. bilabiatum;* dark or black in *A. inundatum, A. bracteolatum*. Key includes *Memora*.

Corollas puberulent; leaves bi- or trifoliolate.

Leaflets marginally yellow-cartilaginous.....*A. inundatum.*

Leaflets not margined or merely discolored.

Calyx glabrous or nearly.

Calyx coriaceous, denticulate.

Leaves blackening, dried; calyx about 8 mm. long.
A. bracteolatum.

Leaves gray-green or brown, dried; calyx to 1.5 cm. long.
A. impressum.

Calyx membranous, cleft, 1.5 cm. long or longer.
A. bilabiatum.

Calyx densely yellow-puberulent, impressed glandular.
A. Uleanum, A. latifolium.

Corollas glabrous; leaves (at least lower) pinnate or bipinnate.

Calyx truncate-denticulate, subcoriaceous; leaves glabrous above.
M. flavida.

Calyx unevenly lobed or cleft.

Calyx usually coriaceous; leaflets glabrate or glabrous.

Venation obscure or impressed above; corolla 6–9 cm. long, tube elongate, slender.....*M. Schomburgkii.*

Venation raised above (in Peru); corolla usually shorter, tube short, ampliate.....*M. patula.*

Calyx membranous; leaflets pubescent (type)....*M. magnifica.*

Adenocalymma bilabiatum (Sprague) Sandw. Recueil Trav. Bot. Néerl. 34: 213. 1937. *Memora bilabiata* Sprague, Bull. Herb. Boiss. sér. 2, 6: 375. 1906.

Branchlets brown, lenticellate, early puberulous as the lateral leaf-nerves (8–13 pairs) beneath and the short thyrses or racemes (to 7 cm. long), the corolla conspicuously; leaflets lanceolate to ovate, rounded at base, obtuse to acuminate, to 2 dm. long, half as wide, often much smaller, sometimes larger, chartaceous to coriaceous, opaque or little lustrous, nerves nearly plane on upper surface, raised on the lower, the veins notably anastomosing some distance from margin (Sandwith); pedicels to 14 mm. long, bracts narrowly lanceolate, to 3 mm. long; calyx membranous, often yellowish, tubular-campanulate, deeply split, about 1.5–2.5 cm. long, very minutely, closely lepidote (as ovary) and more or less black-dotted glandular; corolla whitish (throat yellow), to 6.5 cm. long, limb 3–4.5 cm. across, pubescent within, villous at stamen insertion; capsule 16 cm. long, 2 cm. broad, obtuse but scarcely attenuate, valves smooth (lepidote), midnerve obscure; seeds subsemicircular, entirely brown, 13 mm. long, 3–3.7 cm. broad, the wings corky (from fruit of Venezuela specimen, fide Sandwith).

Loreto: Near Iquitos, *Klug 1590* (det. Sandwith). To the Guianas.

Adenocalymma bracteolatum DC. Prodr. 9: 200. 1845; 97.

Branches slender, flowering about 2.5 mm. in diameter, dark (dried); stipules not obvious; leaflets broadly elliptic to oblong-lanceolate, obtuse or mucronate, 2–3.5 cm. long, about 1–1.5 cm. wide, subnitid above, densely lepidote beneath, lateral nerves 5 or 6, transverse veins prominent; racemes lateral, to 6 cm. long, bracts and bractlets 1–1.5 mm. long; calyx coriaceous, subturbinate-tubular, minutely denticulate, sparsely glandular, pilosulous above, 8 mm. long; corolla yellow, 3–3.5 cm. long, subtomentose as rounded lobes, pubescent within at stamen insertion; ovary glabrous, ovules 32 per cell.—Marked by the minute bractlets.

San Martín: Juanjuí, *Klug 4269* (det. Sandwith). Bolivia.

Adenocalymma impressum (Rusby) Sandw. Recueil Trav. Bot. Néerl. 34: 212. 1937. *Bignonia impressa* Rusby, Mem. Torrey Bot. Club 6: 100. 1896. *A. auristellae* Kränzl. Notizbl. Bot. Gart. Berlin 6: 371. 1915.

Glabrous, the branches lenticellate; leaflets broadly oblong, mostly acute, concolor but lustrous only above, 3–5-nerved, to 13 cm. long,

8 cm. wide, tendril deciduous; inflorescence to 2 dm. long; calyx thick coriaceous, cylindric, 1.5 cm. long, tube minute; corolla moderately ampliate, 5.5 cm. long, base 8–10 mm. broad, 2.5 cm. across above, yellow, fleshy coriaceous as the excavated disk; ovary glabrous.—Flowers orange-yellow; well worth cultivating (Seibert). To be considered, as near and the earlier name, is the Venezuelan *A. apurense* (HBK.) Sandw. Lilloa 3: 461. 1938, calyx glabrous, few if any glands; corolla 5–7 cm. long, limb about 3 cm. wide (type; Kränzlin's plant, Alto Acre, Seringal Auristella). F.M. Neg. 26186 (*A. auristellae*).

Huánuco: Near Tingo María, *Asplund 13348.*—Madre de Díos: Maldonado, *Seibert 2011* (det. Sandwith). Bolivia; Brazil. "Huangana huasca" (Seibert).

Adenocalymma inundatum Mart. in DC. Prodr. 9: 201. 1845; 94.

Glabrous or essentially, the striate branchlets (drying dark) minutely papillose and yellowish lenticellate, dark-spotted, the tendrils simple at least in the variety *surinamense;* leaflets ovate to ovate-oblong, rounded or subcordate at base, abruptly and obtusely cuspidate, often 1–1.5 dm. long, to 1 dm. wide, coriaceous in age, drying olive or dark, lustrous, minutely lepidote, marginally cartilaginous and discolored, lateral nerves 5–8, reticulation rather prominent; inflorescence sometimes 3-furcate, rarely 1 dm. long, puberulous or the corollas glabrous in age; bracts 3–4 (–10) mm. long; calyx also (as corolla) black-glandular above, sometimes short-tubular, and 1 cm. long, subentire; corolla yellow, 5.5–7 cm. long, limb to 5 cm. across, the linear-oblong anther connectives conspicuously produced; ovary sparsely lepidote.—The variant *surinamense* Bur. & Sch. has corollas early scurfy puberulent, oblong capsules 2 dm. long, 4–4.5 cm. broad, shortly attenuate at tip, valves lenticellate and rugulose (longitudinally), the midnerve thick but not raised; seeds entirely brown, about 28 mm. long, 4–5 cm. wide, the narrow wings corky. *A. bilabiatum* (Sprague) Sandw., similar in extra-Peruvian range and thus to be expected, has emarginate leaflets, longer split calyces, whitish corollas. Flowers sulphur yellow; determined by Sandwith.

Loreto: Río Mazán, *José Schunke 229.* Río Maquia, *Seibert 1889.* To the Guianas.

Adenocalymma Uleanum Kränzl. Notizbl. Bot. Gart. Berlin 6: 372. 1915. *A. latifolium* Rusby, Descr. S. Am. Pl. 121. 1920, at least as to Peru.

Multilenticellate branches terete, glabrous; stipules oblong, to 1 cm. long, puberulent as the densely reticulate leaf veins beneath; leaflets 2, ovate-oblong, obtuse or obtusely acute, to 2 dm. long, 11 cm. wide; racemes elongating, the rachis after anthesis to 2.5 dm. long, yellowish puberulent-tomentulose as the promptly caducous cymbiform bracts (these to 1.5 cm. long) and the immersed glandular calyces (in herb. bibracteolate); calyx subcylindric-campanulate, shortly denticulate, 12 mm. long, 5–7 mm. across; corolla campanulate, scarcely bilabiate, yellowish (to orange), to 4 cm. long, 13 mm. broad, puberulent, sometimes glandular as calyx.—After author, who notes that type was referred by Sprague to *A. bracteatum* P. DC. of southern Brazil with usually much smaller leaves, those of *A. Uleanum* suggesting *A. macrophyllum* P. DC.; the former has included stamens in the 7 cm. long corolla, the latter has visible stamens, the corolla 4–4.5 cm. long. However, Sandwith has distinguished in herb. also *A. latifolium* Rusby, which compare. F.M. Neg. 18466 (*Ule 9784*).

Junín: Puerto Bermudez, *Killip & Smith 26410* (det. Killip, *A. bracteatum* DC.).—Loreto: Yurimaguas, *Ule 6280*, type.—Madre de Díos: Maldonado, *Seibert 2009* (det. Sandwith, *A. latifolium*). Río Acre, Brazil, (*Ule 9784*). Bolivia.

5. PACHYPTERA DC.

Distinctive by peculiarly seriate subulate-lanceolate acute stipules and by prominent gland areas both nodal between the petioles and at apex of each of the latter. Branchlets costate, sulcate. Leaflets 2–3-foliolate; the tendrils trifid. Flowers in axillary racemes, the subcampanulate truncate calyx sometimes unevenly lobulate or denticulate, the narrowly funnelform corolla puberulous without, the lobes with 2 rows of glands. Anthers densely white villous, the cells incurved upwardly; staminode apically villous. Ovary 4-costate, densely ferrugineous-papillate; ovules biseriate. Capsule oblong-linear, valves parallel, scattered immersed glandular, margins separating and forming a filiform septum. Seeds oblong, pale brown, their corky wings same texture and color as body except for a paler membranous and hyaline apex, this apparently deciduous (Sandwith).

Pachyptera kerere (Aubl.) Sandw. Recueil Trav. Bot. Néerl. 34: 219. 1937; 59. *Bignonia kerere* Aubl. Pl. Guian. 2: 644, *pl. 260.* 1775 (excl. fruit). *P. foveolata* DC. Prodr. 9: 175. 1845. *Adenocalymma foveolatum* (DC.) Baillon, Hist. Pl. 10: 7. 1891.

The only species; leaflets about ovate, subcordate at base, long and usually acutely acuminate, a dm. or two long, often less than half as wide, thin-chartaceous, only the venation puberulous, this extremely intricate both sides, the ultimate veinlets always distinctly raised; racemes to 5 cm. long, soon prominently scarred; corolla typically milk-white (apparently purplish or crimson in other countries), 6–8 cm. long, the limb half as wide, lepidote within; capsule 8–15 (25) cm. long, about 1.5 to nearly 4 cm. broad, puberulent; seeds 3.6–6 cm. broad.—Sandwith, l.c., showed the identity of the plant of Aublet and *P. foveolata*, and called attention to Splitgerber's description correcting that of Aublet, who associated other fruit. Since it is known from only about 300 kilometers east of the Brazilian boundary it doubtless occurs in the same watershed within Peru. Illustrated, Contr. Arnold Arb. 5: 140, *pl. 19*. 1933 (*Tanaecium Zetekii* Standley, named for James Zetek, long devoted custodian of the Barro Colorado Natural History Preserve, who, with the aid of the famous zoologist and delightful writer, Thomas Barbour, was largely responsible for the preservation of this tropical island, representative of all American, as Peruvian tropics, at least as to genera; may be a variant).

Madre de Díos (cf. note above). Bolivia; to Central America and Guiana.

6. ANEMOPAEGMA Mart.

In Peru similar in habit and vegetatively to *Pleonotoma* but the striking ribs (obscure in Peru) only more or less quadrately angling, the branches and the leaves tri- or bifoliate, the tendrils simple or finally bifid. Calyx entire. Corolla not coriaceous, glabrous, lepidote or pubescent. Ovary ellipsoid or ovoid-ellipsoid, usually much contracted into the pulvinate disk; ovules few in each of the 2–6 series. Capsule shortly ellipsoid, stipitate, valves smooth, the midrib scarcely raised or clearly impressed. Seeds broadly oblong with wide membranous hyaline wings or these opaque, corky, at least young seeds of *A. paraense* (Sandwith).—The variation in several characters, especially those of the ovary and fruit, suggest that the genus either should be interpreted to include species now considered as distinct groups or should itself be divided. Pollen 5–7-sulcate (Gomes, Rodriguésia 20: 130, *fig. 24*).

Stipules often foliaceous; leaflets cusped, rather opaque, strongly nervose.....*A. chrysoleucum.*

Stipules never foliaceous; leaflets acuminate, lustrous, slender-nerved. *A. floridum.*

Anemopaegma chrysoleucum (HBK.) Sandw. Kew Bull. 1953: 470. 1954. *Bignonia chrysoleuca* HBK. Nov. Gen. & Sp. 3: 134. 1819. *A. paraense* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 131. 1896, fide Sandwith.

Branchlets in age lacquered with a yellowish-brown cortex that ultimately cracks along the prominent ribs (Sandwith), sometimes puberulous only at nodes; pseudostipules, if developed, may attain 2 cm., are usually much smaller, pubescent, venose, punctate to densely scutellate-glandular; leaflets ovate or obovate- or elliptic-oblong, or on young branchlets even lanceolate, rounded or obtuse at base (rarely subcuneate), shortly cuspidate or subacuminate, the lower to nearly 2 dm. long, at least half as wide, firm chartaceous to coriaceous, in age often lustrous, somewhat bullate, puberulous or glabrate on nerves above, punctate lepidote especially beneath, the 6 or more pairs of nerves raised above, reticulation rather open beneath; axillary inflorescences scarcely or little longer than stipules; calyx campanulate, to 12 mm. long (type 6 mm. long), occasionally split, ciliolate at truncate apex, minutely lepidote, usually glabrous; corolla yellow or yellow and white, thick in bud, 4–8 cm. long, tube quite glabrous without, limb to 4.5 cm. across, ciliolate and closely lepidote within, eglandular or at least without regular series without; disk to 2.5 mm. high, often much shorter; ovary lepidote, ovules 6-seriate; capsule valves coriaceous, lustrous, glabrous (minutely lepidote), smooth, midrib very thin, scarcely raised, attenuate to tip, 8 cm. long.—After Sandwith, Fl. Suriname, 35, who noted: extremely variable in texture and size of leaflets, corolla length, the diagnostic features being roundish stipules, short indument, 6 or more lateral nerves (each side rib), glabrous corolla tube. *A. Parkeri* Sprague, also Amazonian, has conspicuously impressed venation, the corolla tube densely lepidote without. Type (HBK. species) from Río Magdalena. Determinations by Sandwith.

Loreto: Fortaleza near Yurimaguas, *Klug 2827.* Florida, Río Zubineta, *Klug 2005.* Balsapuerto, *Klug 2973?* (may be *Petastoma Poeppigii*).

Anemopaegma floridum Mart. ex DC. Prodr. 9: 1845; 134.

Flowering branches rather stout, terete or subtetragonous, glabrous as the leaves and inflorescence except for minute lepidosity,

this conspicuous even on corollas under a lens; tendrils rarely persisting and trifid; leaflets oblong or ovate-oblong, shortly but very acutely acuminate or subcaudate, 5–15 cm. long, 3–6 cm. wide, rigid-membranous or subcoriaceous, lustrous above, opaque beneath, castaneous or dark in drying, usually with 5 nerves prominent on both sides as the transverse veins; stipules small or obscure; racemes axillary or from old wood, rachis scarcely more than a cm. long, 4–6-flowered; peduncles, pedicels, calyces 5–7 mm. long, the last coriaceous, cupulate, truncate; corolla 5 cm. long, campanulate-funnelform, puberulent within near stamen insertion; disk shallow (2.5 mm. high), narrowed into ovary stipe, ovules in 4 series.

Loreto: Near Iquitos, *Klug 1098* (det. Sandwith). Balsapuerto, *Klug 3101*.

7. **PSEUDOPAEGMA** (Bur. & Sch.) Urban

Similar to *Anemopaegma* and also probably with both simple and trifid tendrils but pollen grains 5–10-sulcate (Urban); branches not angled and nodal glands present, sometimes hidden by indument, according to Sandwith, who, l.c. 610, has given a key to the six known species and remarked: "presence, absence and quality of indument is likely . . . to prove only of varietal significance, while length of calyx teeth is suspect as a specific character." This statement may be found to apply also to glandular development.

Pseudopaegma insculptum Sandw. Kew Bull. 1954: 608. 1955.

Branchlets, petioles (3–5 cm. long), and petiolules puberulous; stipules not foliaceous; leaflets ovate (not broadly), rounded or subtruncate at base, acute or cuspidate, about 1–1.5 dm. long, 6.5–8.5 cm. wide, coriaceous, glabrous (unless midrib above), punctate-lepidote especially beneath, the 7–9 primary nerves prominent beneath, several with veinlets intricately impressed above giving a smooth shagreened appearance; inflorescence short, many-flowered, densely crisped puberulous; calyx 5–6 mm. long, 9 mm. across at apex, papillose, puberulous and glandular, minutely denticulate; corolla yellow, 4.5 cm. long, tube 1.5 cm. long, apex 1.6 cm. across, glabrous except glandular papillose at insertion of filaments, limb 2–2.5 cm. across, lobes, especially marginally, pubescent and glandular; ovary ellipsoid, compressed, densely lepidote; ovules about 6-seriate.—Near *P. oligoneuron* Sprague & Sandw. l.c. 88. 1932, of east-central Colombia, with broadly ovate leaflets, veinlets not im-

pressed, corolla lobes glabrous (author). Type from Río Caqueta, Colombia, an area with many species also found in adjacent Peru.

Peru (probably). Colombia; Brazil.

8. CLYTOSTOMA Miers

Scandent, the leaves simple or trifoliate, or bifoliate and the tendril simple; flowering or younger branchlets with conspicuous cataphylls toward base; gland areas none. Stipules small, usually subulate-lanceolate. Inflorescence ordinarily small (2 to few flowers), in one species abundantly floriferous and terminal. Calyx broadly campanulate, distinctly ribbed and venose, unevenly lobed or subulate-denticulate, the teeth from below the margins, rarely cleft. Corolla funnelform, thin, delicate, lepidote or (and) crisped pubescent. Anthers glabrous. Disk platter-shaped, sinuate. Ovary obtusely tuberculate or lepidote, ovules 2–4-seriate. Capsule short, oblong-ellipsoid, not alate, densely echinate, the valves parallel. Seeds broadly oblong, rather corky, the somewhat thinner wings same color but not membranous.—Pollen not sulcate (Gomes, Rodriguésia 20: 130, *fig. 25*).

Flowers few.

Flowers decussate-paniculate, 5.5–6 cm. long; calyx cleft or (and) minutely dentate.....*C. sciuripabalum.*

Flowers 2–5-umbellate, rarely peduncle 3-flowered; calyx teeth minute, conical.....*C. binatum.*

Flowers many in terminal panicles; calyx teeth minute, membranous at base.....*C. Uleanum.*

Clytostoma binatum (Thunb.) Sandw. Recueil Trav. Bot. Néerl. 34: 231. 1937; 37. *Bignonia binata* Thunb. Pl. Bras. 35. 1821. *B. purpurea* Lodd. Hook. Bot. Mag. ser. 3, 25: *pl. 5800.* 1869. *C. noterophilum* (DC.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 153. 1896.

Quite glabrous except corolla, the short flowering branches tetragonous, older nodes lenticellate; leaves simple or the upper bifoliolate, the tendrils long, flexuose, the oblong-elliptic shortly petioled leaflets obtuse or shortly cuspidate, rounded at base where somewhat 3-nerved, 8–13 cm. long, 3–5 cm. wide; flowers binate or ternate in

axils or terminal, the 1–3 cm. long peduncles with minute basal bractlets; calyx tubular-campanulate, obscurely denticulate or unevenly lobulate, 5–8 mm. long, slightly lepidote; corolla mauve with white eye, 5.5–6.5 cm. long, tube funnelform, 2.5 cm. long or longer, sparsely pilosulous, sometimes puberulous at base of included stamens; ovary muricate, the ovules biseriate; capsule ligneous, 7 cm. long, 4.5 cm. broad, densely conico-setulose.—Similar to *C. callistegioides* Bur. of Brazil, the calyx teeth subfiliform, more than half as long as the tube. Perhaps not this species, generic determination by Standley; flowers lilac, rose and yellow (Klug). Illustrated, Bot. Mag. *pl. 5800.*

San Martín: Chazuta, *Klug 4138?* Paraguay to Venezuela and Guianas.

Clytostoma sciuripabalum Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 149. 1896.

Terete branches striate, the older subquadrate copiously lenticellate; tendrils often weak and caducous; leaflets oblong or suboblong, shortly and subobtusely acuminate, sparsely lepidote both sides, herbaceous, 6–9 cm. long, about half as wide, nerves 6–8, not at all clearly 3-nerved from base; panicles sessile, bracts caducous; calyx cleft on one side, 8–9 mm. long, teeth 1 mm. long, coriaceous; corolla lilac, campanulate-funnelform, minutely lepidote, 5.5–6 mm. long, puberulent within at stamen insertion; disk scarcely 0.5 mm. high; ovary linear-oblong, muricate, ovules 2–4-seriate; style pilosulous below.—Collection det. Sandwith with remark "apparently, but fruits are needed; flowers pure lavender" (Seibert).

Loreto: Reddish sandy clay, 330 meters, Iberia, *Seibert 1949.* Brazil (São Paulo).

Clytostoma Uleanum Kränzl. Notizbl. Bot. Gart. Berlin 6: 374. 1915. *Macfadyena violacea* Rusby, Mem. N. Y. Bot. Gard. 7: 356. 1927, fide Sandwith.

Glabrous; leaves bifoliolate, the tendril (to 14 cm. long) often fallen, the leaflets oblong-elliptic, obtuse or acute, lustrous, especially beneath, in type 10–13 cm. long, 8 cm. wide; panicles terminal, large, purplish in drying, pedicels 5–8 mm. long; calyx membranous between the minute teeth, 6–7 mm. wide and long, lightly squamulose; corolla violet, funnelform from base, puberulent, bilabiate, 5.5–6 cm. long, the tube 3.5 cm. across above, the throat oblique; longer stamens half as long as tube; disk crenulate.—

Seems very distinct on account of the large terminal panicles (to 4 dm. long), showy light violet or lilac flowers, large leaflets; calyx with a purplish truncate membrane (this pubescent like corolla without) between the thick shortly deltoid acuminate teeth; capsule oblong, echinate, 1.5–2 dm. long, excluding the prickles, these 6–9 mm. long, 5–8 mm. broad at base; seeds 2–2.5 cm. long, 5–6.5 cm. broad, pale brown, the wing on one side reduced (subevanescent; embryo appears placed at one end), the other wing very broad, firm-membranous with a narrow membranous whitish hyaline margin, according to Sandwith, Kew Bull. 1954: 605. 1955, who also observes that Sandeman's plant has much smaller calyx teeth, corollas and conspicuously cordate leaflets; he suggests it may be at least a distinct variety.

San Martín: Juanjuí, *Klug 3818* (det. Standley, as ined. *Adenocalymma*).—Huánuco: Tingo María, (*Asplund 12243*). Ganso Azul, Río Pachetea, (*Sandeman 3376?*). Bolivia; Brazil (Río Acre).

9. **SCOBINARIA** Seibert

Scandent shrub, the subterete slender lenticellate branches ampliate and complanate at nodes with many interpetiolar glands. Leaves bifoliolate, marked by terminal scar of caducous tendril. Thyrse axillary or terminal, few-flowered. Calyx narrowly tubular-campanulate, membranous, sub-bilabiate or lobulate-serrate. Corolla purple, funnelform, pilose. Stamens included, cells divaricate, narrow. Disk annular. Ovary oblong, 4-angled. Capsule compressed, elongate-linear, densely verrucose-tuberculate; seeds suboblong, the broad membranous wings hyaline-margined.—The capsules of other genera which are compressed-linear are quite smooth; *Adenocalymma* and *Martinella* have no interpetiolar glands; *Arrabidaea* has smooth capsules, a short-pubescent more or less coriaceous calyx (author). The leading characteristics are the large tubular-campanulate bilabiately split calyx and the remarkable long compressed linear closely prickly capsule (Sandwith).

Scobinaria japurensis (DC.) Sandw. Kew Bull. 440. 1959. *Tabebuia japurensis* DC. Prodr. 9: 214. 1845. *Arrabidaea japurensis* (DC.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 65. 1896. *A. lenticellosa* Bur. & Sch. l.c. 64, at least as to Peru. *Adenocalymma verrucosum* Standl. Field Mus. Bot. 4: 323. 1929. *Martinella verrucosa* Standl. Contr. Arnold Arb. 5: 138. 1933. *Arrabidaea belizensis*

Standl. l.c. 8: 48. 1930. *A. nicotianaeflora* Kränzl. Notizbl. Bot. Gart. Berlin 6: 369. 1915.

Upper branches soon glabrous and smooth above, dark, more or less lenticellate-tuberculate below, a few simple trichomes early present as on the petioles, petiolules (1–3 cm. long) and leaflets, these elliptic-oblong or subovate, shortly and obtusely or acutely acuminate, or subobtuse, often 7–10 (15) cm. long, 3–5 (7) cm. wide, sparsely lepidote, papillose, lustrous, especially above, more or less obviously reticulate-veined, concolor and opaque beneath where barbellate in the axils of the 4–5 larger nerves; racemes shorter than leaves, axillary or terminal, few-flowered, the bracts minute; pedicels (with peduncles) 10–18 mm. long (shorter in Peru); calyx in Peru early 6–8 mm. long, in type to 1.5 cm. (DeCandolle), 2.5–3 cm. long (Schumann), finally to 1.5 cm. across above, subevenly bilabiate or often later cleft, coriaceous and dark at base, membranous and paler above; corolla roseate (Schunke), dark violet, white within or deep red-wine (Klug), 5– nearly 8 cm. long including the rounded lobes (3 cm. long, DeCandolle), puberulent tomentulose also within near stamen-insertion; disk solid, to 17 mm. long; ovules 24 per cell, biseriate; capsule prickly, drying dark; seeds pale brown except the sordid white narrow hyaline wing margin.—The fruit, rough like a wood rasp, and the seeds, agree exactly with those of *S. verrucosa* (Standl.) Seibert, type of the genus from Central America (Sandwith).

The plant resembles *Phryganocydia* Mart. to which Martius in herb. referred it, but the disk is well-developed. *A. lenticellosa* Bur. & Sch. seems to be material with closely tuberculate branches, smaller leaflets, subcoriaceous calyx, 25–28 mm. long, orange (?) corolla (type from Mato Grosso, Brazil); to it Seibert referred the Schunke collection; the species is probably variable. The extra-Peruvian synonymy, after Seibert, is given in deference to the final decision of Standley which seems to suggest that he questioned the logical but probably unnatural classification in the family. A photo of the Vitoc specimen in the U. S. National Herbarium has been seen, courtesy of the staff. Illustrated, Carnegie Inst. Wash. Publ. 522: 434, *pl. 5* (*S. verrucosa*).

Junín: Vitoc, *Ruiz & Pavón*, fide Schumann.—Loreto: Balsapuerto, *Klug 1143* (det. Sandwith). Mouth of Río Santiago, *Tessmann 4347*. Río Mazán, *José Schunke 86*.—Madre de Díos: Río Tahuamanu, Iberia, *Seibert 1953* (det. Sandwith). Bolivia to Central America; Venezuela.

10. MARTINELLA Baillon

Trichomes (if present) of branchlets, often petioles, racemes, minutely glandular; immersed nodal glands and lenticels usually none. Leaves bifoliolate, tendril trifid, the short branches recurved but often caducous (or tendril simple), stipules obsolete. Racemes rarely branched toward base. Flower buds obovoid, apiculate. Calyx unevenly (slightly bilabiately) 2–3-lobed. Corolla more or less funnelform, the tube glabrous as the divaricate-celled anthers. Ovary sparsely if at all lepidote, ovules 4-seriate (biseriate, Sampaio). Capsule linear, attenuate both ends, compressed, the parallel valves thickened marginally, the middle nerve obscure. Seeds oblong, broadly membranous-alate.—The Peruvian liana may be referable to the entity of Sampaio, who distinguished two species as follows; but the characters may not be constant.

Corolla 2.8–3 cm. long, lilac; tendrils trifid; leaflets herbaceous, 9–13 cm. long, 4–7 cm. wide; calyx glabrous.....*M. obovata.*

Corolla 4.5–5 cm. long, dark purple; tendril simple; leaflets coriaceous, 14–17 cm. long, 8–9 cm. wide; calyx (lens) densely scaly and sparsely pilosulous.....*M. iquitosensis.*

Martinella iquitosensis Sampaio, Ann. Acad. Bras. Sci. 7: 122. 1935.

Branches stout, glabrous but immersed dark glandular at base of nodes; leaves conjugate; leaflets yellowish-green, concolor, ovate-elliptic, acute or obtusely acuminate, acute at base, glabrous, sparsely black glandular beneath, the principal nerves usually 5; inflorescence lax, few-flowered, 8–12 cm. long, dark glandular at nodes, the pedicels strongly pilosulous; calyx drying black, in bud obconic-elliptic, becoming 3-lobulate, glabrous within, lepidote and sparsely pilose without, 16–18 mm. long; corolla arcuate, glabrous about two-thirds below, the lobes puberulous, 4–8 mm. long, the tube 1.5 cm. long; stamens subequal, pollen trisulcate, exine reticulate; disk 1 mm. high; ovary narrowed at both ends, glabrous; ovules biseriate, about 36. —If this is distinct from *M. obovata*, as seems probable on the basis of the biseriate ovules (accurately observed?), probably all the Peruvian specimens, at least those from the region of Iquitos, belong to it.

Loreto: In high woods near Iquitos, (*Kuhlmann 1492*, type).

Martinella obovata (HBK.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 161, *pl. 84*. 1896. *Spathodea obovata* HBK. Nov. Gen. & Sp. 3:

(115) 147. 1819. *Anemopaegma leptosiphon* Rusby, Mem. N. Y. Bot. Gard. 7: 354. 1927, fide Sandwith.

Glabrous, glabrate or puberulent, often some of the minute trichomes gland-tipped; branchlets striate; leaflets ovate- to rounded-elliptic, or lanceolate, rounded to subcordate at base, cuspidate-acuminate, to about 1.5 dm. long, usually more than half as wide, firm-chartaceous, slender; lateral nerves 6 or more, rather noticeable as the venation especially on the paler under surface; racemes lax, about a dm. long (sometimes much longer), flexuose as often the slightly reflexed short or elongate pedicels; calyx 12–17 mm. long, the broad lobes 3–9 mm. long; corolla 3.5–7 cm. long, obscurely lepidote; ovary constricted-stipiform above the pulvinate disk; capsule brown, 4–8 dm. long, about 1.5 cm. broad; seeds 10–14 mm. long, 4–6 cm. wide, yellowish as the wings.—Flowers said to be dark purple north of Peru but Klug noted them as pale and dark violet or white; these collections, violet and yellow, determined by Standley may be distinct as *M. iquitoensis* Sampaio, Ann. Acad. Bras. Sci. 7: 122. 1935.

San Martín: Chazuta, *Klug 4128*. Juanjuí, *Klug 4348*.—Loreto: Yurimaguas, *Killip & Smith 29073* (det. Seibert). Balsapuerto, *Klug 3106*. Bolivia to Central America; Trinidad.

11. PITHECOCTENIUM Mart.

Scandent by trifid tendrils replacing the terminal leaflet of some of the trifoliate leaves, the foliose branchlets strongly fibrous, the prominent fibrous ribs effaceable. Nodal gland areas obsolete; pseudostipules often obvious. Inflorescence terminal. Calyx coriaceous, campanulate, truncate. Corolla funnelform or rather so, densely tomentose or furfuraceous. Anthers glabrous; cells divaricate. Ovary contracted above the conspicuous pulvinate disk, ellipsoid, softly appressed spinulose; ovules pluriseriate. Capsule ligneous, flattened-ellipsoid, densely echinate with a subquadrangular apical appendage, the prickles more or less persisting; seeds oblong, the body thin, the hyaline wings very broad.—Sandwith well describes the pod; sterile part of septum thin, flattened and with broad margins flattened at right angles; these are formed by the seminiferous borders bent at right angles to the septum proper, thus coming to be in the same plane so that the entire structure resembles two shallow trays back to back. Pollen not sulcate (Gomes, Rodriguésia 20: 130, *fig. 25*).

Pithecoctenium echinatum (Jacq.) Schum. Pflanzenfam. 4, Abt. 3b: 218. 1894; 45. *Bignonia echinata* Jacq. Enum. Pl. Carib. 25. 1760.

Lepidote with lustrous white scales and more or less pubescent with simple trichomes on younger branchlets, petioles and leaflets; pseudostipules (if evident) oblong-spatulate; leaflets ovate, sometimes suborbicular, basally rounded to clearly cordate, cuspidate, 5–13.5 cm. long, 4–10 cm. wide, thin-papery (drying greenish), lateral nerves 4 at or near base on each side of midrib, intricate reticulation often scarcely apparent; calyx 7–10 mm. long, obscurely denticulate, tomentulose and with gland areas on upper half; corolla white or yellowish, frequently curved, 4–6 cm. long, tomentose with simple trichomes, the limb to 4 cm. across, very pubescent within, the seriate glands below lobes not visible; capsule 10–22 cm. long, 4.5–6.5 cm. broad, prickles deltoid-subulate, acute, to 4 mm. long; seeds 2.5–3 cm. long, 6–8 cm. broad, nitid, the embryo yellowish, the hyaline wings whitish.—Clambering, forming large leafy masses at forest edge (Vargas, etc.). *P. cynanchoides* DC. of Argentina, much cultivated, has a denticulate calyx, a shortly echinate smaller capsule. Illustrated, Mart. Fl. Bras. 8, pt. 2: *pl. 86;* Oesterr. Bot. Zeitschr. 80. *pl. 2, fig. 3* (staminode).

Cuzco: Valle de Santa Ana, 1,250 meters, *Herrera 985.* Convención, *Soukup 898.* Echarate, *Goodspeed Exped. 10466* (det. Standley). Paraguay to Colombia and some of the West Indies. "Espiguilla."

12. DISTICTELLA Kuntze

Vegetatively resembles *Pithecoctenium* but the branchlets terete, without detachable fibrous ribs. Inflorescence terminal or axillary, often a thyrse. Corolla with a villous-tomentose ring below the insertion of the stamens. Disk pulvinate or annular-cupulate. Ovary tomentose, the ovules in 4 rows on each of the 2 distinct placentae in each cell. Capsule smooth, oblong-ellipsoid, attenuate both ends, not appendiculate, the valves with a distinctly raised midrib; seeds of the related genus. Was included by Bureau and Schumann at least more conveniently in *Distictis* Bur. with paniculate inflorescence. Leaves in herbaria brown or greenish-brown.

Distictella racemosa (Bur. & Sch.) Urban, Repert. Sp. Nov. 14: 310. 1916; 42. *Distictis racemosa* Bur. & Sch. in Mart. Fl. Bras.

8, pt. 2: 179. 1896. *B. Rusbyi* Britton, Bull. Torrey Club 27: 71. 1900, fide Sandwith.

Branchlets finely striate, early densely pulverulent or pubescent, usually glabrate and lenticellate in age; leaflets ovate- or elliptic-oblong, obtuse or rounded at base, shortly acuminate, a dm. or two long, about half as wide, finally coriaceous, glabrous but punctate-lepidote, often slightly shagreened and lustrous above, dull below, the 4–5 lateral nerves typically arcuate-ascending, the veinlet-reticulation impressed on both surfaces; thyrses or racemes narrow, 1–2 dm. long, branches 1- or 3-flowered; calyx subcampanulate, 9–14 mm. long, minutely tomentulose, often purplish (dried) and with large gland areas above; corolla white, campanulate-funnelform, 5–6 cm. long, limb about 5 cm. across; style pubescent; capsule tomentulose and with many impressed platiform glands, 12–14.5 cm. long, 4–5 cm. broad.—After Sandwith (as most descriptions), who notes (as Britton) *Spruce 1721* as conspecific but leaves more oblong, broadly rounded at base, the nerves more spreading. Collected in Bolivia on the Río Madre de Díos it is to be expected within Peru on the same river. Similar, but less likely to be encountered is *D. magnoliifolia* (HBK.) Sandw. Lilloa 3: 460. 1938, the veinlets elevated both surfaces (Sandwith, Kew Bull. 1953: 477–479. 1954); if this character does not hold, this is the older name. *D. pulverulenta* Sandw. Brittonia 3: 91. 1938, found as near as Paulo Olivença, has leaflets pulverulent beneath.

Loreto: Río Ucayali, *Seibert 1891; 2233* (det. Seibert). Mishuyacu, *Klug 707; 758* (det. Sandwith). Río Mazán, *José Schunke 79* (det. Killip). Bolivia to Colombia and Guiana.

13. **PARAGONIA** Bur.

Scandent by bifid or trifid tendrils that consistently replace the terminal leaflet of the ternately compound leaves. Branchlets subterete, obviously lenticellate as capsules but immersed nodal glands obsolete. Stipules subulate, lanceolate, usually striate in age. Thyrse terminal, many-flowered. Calyx campanulate, subtruncate or lobed unevenly. Corolla funnelform, in bud velvety, in anthesis more or less scurfy tomentose. Anthers glabrous, cells divaricate, connective produced. Disk cupulate. Ovary lepidote, thick-walled; ovules biseriate. Capsule elongate-linear, acuminate, the parallel valves densely tuberculate, the midrib raised, the broadly and thinly alate seeds narrowly oblong.—One of the black sheep, so to speak, in the

taxonomic setup; it appeared in litt. in at least four different groups and was logically in any case placed by Bureau in a genus by itself, following the redefinition of *Bignonia* L. Sprague observed that in flower it may be identifiable by the velvety corolla, the large cupular disk and the very thick walls and small chambers of the ovary. Herbarium leaves dry unevenly gray-greenish brown or rarely darken, usually only in part, somewhat lustrous or subopaque.

Paragonia pyramidata (L. C. Rich.) Bur. Vidensk. Meddels. Naturh. Foren. 104. 1894. *Bignonia pyramidata* L. C. Rich. Act. Soc. Hist. Nat. Paris 110. 1792.

Branchlets finely striate, minutely lepidote as leaflets, those suboblong to elliptic, obovate or ovate, obtuse or rounded basally, shortly acuminate or cuspidate, often 1–1.5 dm. long, 4–8 cm. wide, thin-coriaceous, closely reticulate both sides, often as branchlets and calyces drying darker unevenly or grayish-brown; lateral nerves 5–7; thyrse 1.5–2 dm. long or longer, densely puberulent and lepidote; calyx 6–10 mm. long, coriaceous, usually (rarely obscurely) obtusely papillate or beneath tuberculate; corolla pink or purple, 3–7 cm. long, limb 2.5–4 cm. across, pubescent within; capsule obtusely tuberculate, strongly attenuate, to about 2.5 cm. thick, 4 dm. long or longer; seeds to 1 cm. long, 3.5 cm. broad, the wings sordid white to dark brown.—The var. *tomentosa* Bur. & Sch. has leaves merely lepidote or glabrous only above. After Sandwith, who, curiously, in listing the range does not include Peru; he notes that Urban erred in suggesting that the fruit illustrated by Hooker (*pl. 2772*) does not belong here; he adds three names to Sprague's synonymy in Hooker's Icones Pl. *pls. 2771, 2772.* Flowers blue-pink (Mexia); all parts of corolla within white, without purplish or wine-red, calyx red-dotted, leaf nerves pale (Woytkowski).

Stems used for lashings (Mexia).

San Martín: Near Tarapoto, *Woytkowski 35010; 35164.* Zepelacio, *Klug 3409.* Pongo de Cainarachi, *Klug 2623* (det. Sandwith). —Junín: La Merced, Weberbauer; 283.—Loreto: Río Pachitea, *Killip & Smith 26825* (det. Killip). Río Ucayali at Río Maquia, *Seibert 1890* (det. Seibert). Mazán, *José Schunke 31; Mexia 6471.* Florida, Río Zubineta, *Klug 1996.* Río Itaya, *Killip & Smith 29535.* Yurimaguas, *Mexia 6077.* Pongo de Manseriche, *Mexia 6181; 6369* (det. Sandwith).—Madre de Díos: Maldonado, *Seibert 2010* (versus var. *tomentosum* Bur. & Sch., Sandwith). Brazil, Paraguay, Bolivia to Mexico and the West Indies. "Huachamosa" (Mexia).

14. TANAECIUM Sw.

Branchlets subterete, with or without nodal glands, the leaves trifoliate or bifoliolate and terminating in a simple tendril. Stipules not foliaceous. Calyx tubular-campanulate, truncate, sometimes slightly lobed or split and denticulate. Corolla white or sordid yellow, more or less hypocrateriform, the narrow cylindric tube gradually enlarged near the apex into the limb. Stamens inserted above the middle of the tube, the glabrous anthers usually somewhat exserted from the throat, the cells divaricate to arcuate. Disk pulvinate-cupulate. Ovary ovoid-oblong, lepidote; ovules pluriseriate. Capsule ellipsoid-subcylindric, ligneous, the smooth very convex valves sometimes with a well-defined longitudinal groove; septum margins flattened at right angles; seeds oblong, thick, corky, the wings as thick as the nucleus for a distance but apparently with a membranous hyaline deciduous margin.—After Sandwith (as most generic descriptions), who aptly describes the capsule as almost sausage-shaped, although Ducke notes that it is fat and woody; striking in the long corollas (Peru).

Tanaecium nocturnum (Barb. Rodr.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 185. 1896–7. *Osmohydrophora nocturna* Barb. Rodr. Vellosia ed. 2, 1: 49. 1891.

Glabrous except minutely lepidote on the finely striate nitid branchlets, leaves and the long (to 1.5 dm.) terminal thyrse of white or dull yellow flowers; leaflets mostly about ovate, some suborbicular, rounded or slightly cordate at base, acutely cuspidate-acuminate, to about 1.5 dm. long, a dm. or so wide, mostly much smaller, papyraceous, prominently 3–5-nerved at or close to the base, the very fine intricate venation visible both sides; lower thyrse branches 3-, upper 1-flowered; calyx 13–18 mm. long (Sandwith), early truncate, finally lobed or split, copiously lepidote and with narrow vertical gland-areas on the lower half; corolla 8 or 10 cm. long (Sandwith), to 16 cm. (Schumann), the strongly arcuate tube glabrous, the limb 4–5 cm. across, covered within with small raised glands, stamens inserted above the middle, exserted from the throat, the cells falcate-divaricate; ovary costate, the ovules 4–6-seriate, the 4–6 series of ovules on two widely separated placentas.—*T. cyrtanthum* (Mart.) Bur. & Sch. of Brazil and Paraguay has few greenish-white flowers, the corolla tube little curved, stamens included (illustrated, Miers, Contr. Bot. 2: 88, *pl. 6D*). Illustrated, Vellosia, l.c. 3, pt. 2: *pls. 8, 9,*

flowers from old wood in contrast to those of the common *T. jaroba* Sw. of the West Indies.

Peru (fide Sandwith). To Surinam.

15. MACRANTHOSIPHON (Baillon) Bureau

Pyrostegia sect. *Macranthosiphon* Baillon, Hist. Pl. 10: 31. 1891.

Similar to *Pyrostegia* but calyx coriaceous, 5-costate, obtusely dentate, and, especially, aestivation of corolla lobes evidently imbricate.—Baillon's disposition seems to be more useful.

Macranthosiphon longiflorus (Cav.) Sch. in Mart. Fl. Bras. 8, pt. 2: 188. 1896. *Bignonia longiflora* Cav. Icones 6: 58, *pl. 581*. 1799.

Early more or less lepidote, including leaves both sides and truncate calyx without, this about 6 mm. long; leaflets oblong-lanceolate, obtuse, obtusely and shortly narrowed, not pellucid but puncticulate-glandular, 5–10 cm. long, 1.5–4 cm. wide; stipules foliaceous; corolla gradually long-funnelform, glabrous, 7–9 cm. long, tube 1.5–2 cm. long, lobes 12–17 mm. long; capsule 1.5 dm. long, 10–12 mm. broad, seeds 3 cm. long, membranous wing often lacerate.—Type from Guayaquil. F.M. Neg. 18486.

Piura: Amotape Hills, *Haught 122*. Ecuador.

16. TYNNANTHUS Miers

Schizopsis Bur. Monogr. Bignon. 44. 1864; Adansonia 5: 369. 1865, fide author.

Scandent, the branchlets subterete, striate, interpetiolar ribs V-shaped (Seibert), the leaves 3–2-foliolate, the latter with simple tendril, the stipule (caducous) often foliaceous. Panicles, rather thyrses (or dichasia), axillary or terminal, the small (less than 1 cm. long) flowers distinctly bilabiate; calyx turbinate, campanulate, truncate, denticulate, sometimes bilabiate; corolla funnelform, arcuate, tomentulose. Stamens visible, anthers glabrous, ovary conical, pubescent; capsule elongate linear with smooth valves, midrib nerves small, hyaline, alate (known); seeds thus, according to Sandwith, substantiating the validity of the genus.—Bureau, Adansonia 8: 271–274. 1868, in accepting the generic description of Miers, Proc. Roy. Hort. Soc. 3: 179. 1863, adopted the name as feminine, listing examples by Linnaeus. Sandwith, Kew Bull. 1953: 464. 1954, followed Schumann

in treating Miers' spelling *Tynanthus* as an orthographic error (name derived from Greek "small"); in courtesy this correction may be accepted but simplification in spelling rather than indication of derivation should be the desire of all; word origins are rightly destined to become a specialized study or hobby for minds so interested.

Glabrous except inflorescence ..... *T. Weberbaueri.*

Puberulent, at least upper stems, leaf-nerves.

Leaves drying light; indument of stems canescent; calyx bilabiate ..... *T. polyanthus.*

Leaves drying dark; indument obscure, fulvous; calyx not bilabiate ..... *T. myrianthus.*

Tynnanthus myrianthus [Poeppig] Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 197. 1896.

Resembles *T. polyanthus;* indument rather obscure or fulvous; stipules 1–1.5 cm. broad and long; leaflets somewhat ovate, often larger, darkening; panicles ample, divaricately branched, sometimes 2 dm. long, pedicels finally 5 mm. long, calyx about 1.5 mm. long, hypocrateriform, scarcely curved, denticulate; corolla 6 mm. long.—Flowers white (*Klug 4065*) or violet-striped or bright blue (Klug).

San Martín: Chazuta, *Klug 4065* (det. Standley).—Loreto: Yurimaguas, *Poeppig 2388,* type; *Klug 2778* (det. Sandwith). Balsapuerto, *Klug 2836.*—Madre de Díos: *Seibert 1899.* Bolivia.

Tynnanthus polyanthus (Bur.) Sandw. Kew Bull. 1953: 465. 1954. *T. laxiflorus* Miers, nomen nudum, Proc. Roy. Hort. Soc. 3: 1. 1863; 193. *Schizopsis polyanthus* Bur. Adansonia 5: 378. 1865.

Slender (finally quadrate) branches, especially at the complanate nodes, as the leaves, at least on the nerves beneath, and the often ample narrowly pyramidal panicles including the corollas more or less grayish or slightly fulvous puberulent-tomentulose; stipules 7–8 mm. across, suborbicular; leaflets rather inequilateral, oblong-elliptic, obtusely acuminate, mucronate, mostly about 8–10 cm. long, half as wide, with scattered minute trichomes both sides and pellucid-punctate, concolor, the 6 larger nerves and transverse veins prominent; bracts, bractlets persisting; calyx clearly bilabiate, 2.5 mm. long; corolla 6.5–7 mm. long, puberulent also within except at stamen insertion, the stamens basally pilosulous; disk none; ovary subtomentose, ovules 4-seriate, 24–28 (Schumann).—Schumann in deference to his collaborator accepted Miers' ined. name (also another),

realizing the action unjust. Dr. Sandwith admirably commented, l.c. Flowers yellow or red-yellow (Klug). F.M. Negs. 22126; 26214 (both *Spruce 4895*).

San Martín: Tarapoto, *Spruce 4895*, type. Juanjuí, *Klug 4160; 4194*.—Huánuco: Tingo María, *Allard 21811* (det. L. B. Smith).

Tynnanthus Weberbaueri Sprague, Bot. Jahrb. 42: 176. 1908.

Glabrous except puberulent inflorescence including calyx and corolla without, the branchlets densely lenticellate; leaflets elliptic-oblong (terminal obovate), rounded to acute or cuneate at base, obtuse or shortly and acutely acuminate, 8–12 cm. long, 4.5–6 cm. wide, subcoriaceous, densely reticulate both sides, the 5–7 lateral nerves arcuate-ascending; panicles axillary in branchlet tip, shorter than leaves (drying dark); pedicels to 4 mm. long; calyx campanulate, obliquely truncate (posterior teeth obvious); filaments pubescent at base, staminode glabrous; corolla pale yellow, to 6.5 mm. long, glabrous within except simply pilose at stamen insertion and anteriorly with capitate trichomes from there to lobes; disk obsolete; ovary ovoid, tomentulose, style glabrous, ovules 4-seriate, about 20 per cell.—In Peru differs from *T. myrianthus* in its glabrous not at all cordate leaves; from *T. Goudotianus* in the glabrous staminode and pilose (anteriorly) corolla tube (author).

Junín: La Merced, *Weberbauer 1896*, type; 283.

17. MUSSATIA Bureau

Scandent, the tendrils simple and the acutely quadrate branchlets with thick ribs, these separating, gland areas lacking. Leaves bifoliolate; stipules foliaceous (always?). Flowers usually crowded, many in a terminal thyrse, the very short calyx unevenly lobed or split, the funnelform corolla clearly bilabiate, with yellowish, brown, red or blue marks or stripes (purple-lined within dried), thin, only glandular and lepidote without and at stamen insertion toward base; anthers glabrous, short arcuate cells finally subdivaricate. Disk fleshy, shallow, undulate-crenulate. Ovary broadly oblong, grooved, lepidote, the 4–6-seriate ovules on 2 distinct placentae; capsule thick-oblong, ligneous, the parallel valves compressed, glabrous or scaly, rugulose to rugose-warty (not tuberculate or echinate); seeds 2.5–3.5 cm. long, 6–8.5 cm. broad, glabrous, brown, except the narrow pale hyaline membranous margin of the wings (Sandwith, Kew Bull. 1953: 464. 1954).—Pollen grains have the same

form as those of *Tynnanthus* but the exine is uniformly reticulate (Pichon, Bull. Soc. Bot. France 92: 229. 1945) instead of smooth (Urban) as in the other genus, and the grains are trisulcate, which character together with distinctly bilabiate corolla, short disk, curved anther cells favors alliance with *Tynnanthus* to which Schumann, Standley and Sprague at different times referred specimens, but branchlets, pseudostipules, lack of indument within, peculiarly colored lepidote corolla (except on limb), and shorter calyx make actual identification with Miers' group inadvisable (Sandwith). In many families, may I venture to remark, the four characters mentioned first would be considered as more indicative of natural generic characterization than the latter.

Mussatia hyacinthina (Standley) Sandw. Recueil Trav. Bot. Néerl. 34: 218. 1937. *Tynnanthus hyacinthinus* Standley, Carnegie Inst. Wash. Publ. 461: 87. 1935.

Stipules (i.e. bud scales) ovate, about 1.5 cm. long, 1 cm. wide; leaflets ovate-oblong to elliptic, rounded or truncate at base, acute or shortly acuminate, mostly 1–1.5 dm. long, about half as wide, papyraceous, many suboviform glands beneath, the nerve axils barbellate; calyx broadly campanulate, spreading, truncate or obscurely lobulate, glandular-lepidote to sparsely pubescent, 1.5–2.2 mm. long; corolla 1.5–2 cm. long, stipitately glandular-lepidote, the tube abruptly expanded at base; capsule (immature?) 17.5 cm. long, 5.5 cm. broad, broadly attenuate-acuminate, thin valves lustrous, smooth but obviously undulate-rugulose (Sandwith from *Philipson 2140*, probably this species).—Well-developed corollas scarcely to 2 cm. long, often much shorter, longer stamens less than 1.5 cm. long, anther cells hardly 1.5 mm. long; the Peruvian record is by Pavón without data in Herb. Dunant, Paris, according to Sandwith, who, l.c. 217, observes that the species may prove to be a small-flowered variant of *M. Prieurei* (DC.) Bur. of Suriname and British Guiana, corollas 3.5–5 cm. long, but leaflets tend to be more ovate, thyrse laxer. However, there may be a difference in capsules at least as to size (see Sandwith, l.c.), that of the eastern ranging plant apparently being much larger, roughly and conspicuously rugose-warty (*Krukoff 5080*, Río Jurua Basin, Brazil, *M. Prieurei?*, Sandwith). The Philipson collection was from Sierra de La Macarena, Colombia, directly north of Loreto, Peru. Illustrated, Oesterr. Bot. Zeitschrift. 80. *pl. 2, figs. 14, 15* (flower).

Peru (cf. note above). Bolivia to Central America, Venezuela.

18. AMPHILOPHIUM HBK.

Scandent shrubs, the leaves trifoliolate, or bifoliolate and with a simple tendril, the branchlets strongly 6-costate, the ribs finally separating. Calyx limb somewhat doubled, the outer slightly 3–5-lobed, the inner appressed bilabiate. Corolla subcoriaceous, the tube short, the large throat ventricose, the limb bilabiate. Staminode rudimentary. Anther cells divaricate. Ovary tomentose or glabrous. Capsule ovate or oblong, more or less ligneous, smooth or rugose-tuberculate, the seeds seriately imbricate, membranous-alate.—Handsome plant, the limb of the corolla more or less curled; species not understood or tenuous.

Leaflets pubescent at least beneath, often concolor; sub-basal nerves usually 5–7, widely arcuate.

Inner calyx lobules (epicalyx) enlarged, reflexing as a collar; leaves pilose-hirsute; ovary glabrous.....*A. Aschersonii.*

Inner calyx appendages various, less enlarged; ovary hirsute-tomentose.

Leaflets scabrous (sometimes also subhirsutulous) above, trichomes minute or few, often branched; calyces tomentose or little hirsute.....*A. macrophyllum.*

Leaflets pilose-hirsute, trichomes mostly long, simple; calyx densely hirsute.....*A. Jelskii.*

Leaflets glabrate or glabrous (types), lepidote, cinereous or greenish beneath; nerves often many and more crowded toward base, ascending.....*A. Mutisii, A. paniculatum.*

Amphilophium Aschersonii Ule in Urb. & Graebn. Festschr. Aschers. 549. 1904.

Conspicuously hirsute-pilose, especially the flowering branches and leaves beneath, the latter at maturity bullate and sparsely hirsute above, a dm. or so long, 8–10 cm. wide, shortly acutely cuspidate, cordate, subcoriaceous, the 5–7 principal nerves connected by many transverse and reticulate veins; stipules foliaceous or obscure or caducous; panicles often 3–4 dm. long, the peduncles and pedicels about 1 cm. long or longer; calyx 3-lobed, 12–15 mm. long, the undulate bullate appendages finally recurved like a collar; corolla glabrous, viscid, about 3 cm. long, tube 16 mm. long, limb 9 mm. long; ovary glabrous, style tomentulose, stigma lobes oblong, 4 mm. wide; capsule 10–12 cm. long, 3–4 cm. broad, strongly rugose.—The pubescence, the large cordate leaflets and the extraordinary

calyx appendages are the notable characters; the corollas, as in all species, are closed at tip and cleistogamous (Ule). Named, of course, to honor the highly revered co-author of a flora of Europe. F.M. Neg. 18445.

Loreto: Fortaleza near Yurimaguas, *Klug 2818* (det. Sandwith). Iquitos, (*Ule 6813*, type). Mishuyacu, *Klug 767; 1280* (both det. Killip, *A. macrophyllum*).

Amphilophium Jelskii Zahlbr. Ann. Naturh. Hofm. Wien 7: 9. 1892.

Branches, leaves above, peduncles, pedicels (both to about 1 cm· long) densely more or less softly hirsute; leaflets cordate, acuminate, to 13 cm. long, 6–10 cm. wide, basally 5-nerved, lateral nerves 4, veins lineate, coriaceous, densely stellate-floccose beneath, nerves ochraceous hirsute; panicles ample; calyx hirsute, 7–8 mm. long, 8–10 mm. across, the lobes rounded, undulate, the 2 inner lobes broadly rounded, forming a short cylinder little exceeding the calyx limb; corolla red, glabrous or sparsely hirsute, about 2.5 cm. long, the tube cylindric, the broader posterior lobe of limb minutely cleft, anterior acutely 3-lobed; ovary densely hirsute, style less so, stigma lobes broadly triangular, subcordate at base; capsule oblong-elliptic, sulcate, acuminate, tuberculate and densely hirsute, 1 cm. long, 3 cm. broad; seeds hirsutulous, amply alate.—After author, who regarded indument and short lobes of limb as notable. This is one of the four types in the National Herbarium at Washington which I have seen, thanks to the courtesy of Lyman B. Smith and associates; and much other material has been sent me, selected by C. V. Morton. F.M. Neg. 32843.

Cajamarca: Tambillo, *Jelski 94*, type.

Amphilophium macrophyllum HBK. Nov. Gen. & Sp. 3: 150. 1819.

Younger branches sulcate-angled; leaflets 2, rounded-ovate, cordate, acuminate, longer (medial) nerves 5, reticulate-veined, membranous, lustrous both sides, above hirtellous, softly so beneath (stellate-tomentose), and the nerves and veins prominent, 1.5 dm. long or longer, 1 dm. wide; panicles fuscous-tomentose, axillary and terminal; flowers pedicellate, 3.5 cm. long or longer, the pedicels and calyces tomentose, the latter 10–12 mm. long, bi- (–4) lobed, appendages crisped-undulate, 4–5 mm. long, lepidote; corolla glabrous, at least 3 cm. long, reddish, tube to 7 mm. long, limb bilabi-

ate, inner lobe trifid, upper bidentate (after authors).—Leaves above scabrous, often also with some scattered trichomes, floccose tomentose beneath. *A. pannosum* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 209. 1896, from Guayaquil, Pavón, type, "leaves manifestly bullate" (entire description), is, according to authors themselves, probably the same. F.M. Neg. 26184 (*A. pannosum*).

Junín: Near La Merced, *Killip & Smith 23882* (det. Killip).—Cuzco: Santa Ana, *Cook & Gilbert 1557; 1558; 1565.* Turbaco, Colombia; Ecuador. "Tsarqui sacjta," "espejilla" (both Cook & Gilbert).

Amphilophium Mutisii HBK. Nov. Gen. & Sp. 3: 116, *pl. 219.* 1819.

Branches early lepidote-tomentulous; tendrils slender, usually caducous; leaflets ovate, rounded or acute at base, acutely acuminate, 6–10 cm. long, 4–8 cm. wide, lustrous above, opaque and paler beneath, lepidote both sides, veins and nerves puberulent, basal nerves 4–6, impressed above; panicles terminal, strict, 1–1.5 dm. long, lepidote and puberulent including flowers; bracts 4 or 5 mm. long; pedicels 3 mm. long; calyx 11 mm. long, acutely 3-lobed, margin scarcely labiate, the appendages about 3 mm. long; corolla 3 cm. long, deeply bilabiate, sparsely lepidote, puberulent within near base; disk pulvinate, pilose as style; ovary subtomentose, sulcate.—Scarcely differs from *A. paniculatum* (Schumann, from whom description is taken), a suggestion worthy of investigation; possibly it represents *A. paniculatum* as to Peru, the latter, distinguished by Schumann in his key as 5-nerved, cinereous or subferrugineous beneath.

San Martín: Tarapoto, *Spruce 4420* (det. Schumann); det. Bureau, *A. paniculatum.* Colombia.

Amphilophium paniculatum (L.) HBK. Nov. Gen. & Sp. 3: 149. 1819. *Bignonia paniculata* L. Sp. Pl. 869. 1753.

Vigorous, densely and minutely glandular lepidote laxly branched liana, the branchlets early brownish-puberulent (ribs ciliate) as at least the nerves of the broadly rounded or cordate-ovate acuminate leaflets (both sides), these to a dm. long, often smaller; panicles terminal or reduced, axillary; calyx shortly campanulate or nearly globose, to 13 mm. long, with a spreading undulate or crisped limb, lobulate within; corolla purple (whitish-blue or fading white), glabrous or limb and lobes pulverulent, about 3–4 cm. long; capsule usually about 1 dm. long or longer, at least 3 cm. broad.—The vari-

ety *molle* (Schlecht. & Cham.) Standl. Field Mus. Bot. 18: 1114. 1938 (type, Vera Cruz, Mexico) is marked by more or less developed stellate indument, the variations in indument sometimes occurring on the same plant (Standley); but at least some West Indies specimens (Linnaeus' type from the Caribbean, Plumier) are not at all stellate; see *A. Mutisii* and the diverse opinion of Bureau and Schumann.

San Martín: Tarapoto, *Woytkowski 35143* (det. Cuatrecasas). Juanjuí, *Klug 4310* (det. Standley).—Huánuco: Tingo María, *Soukup 2199* (det. Killip).—Junín: Colonia Perené, *Killip & Smith 25415* (det. Seibert).—Cuzco: Valle de Santa Ana, Hacienda Potrero, *Herrera 949* (var. *molle*); *Klug 2956; 3975.* Charate, Prov. Convención, *Goodspeed Exped. 10460* (det. Standley). Cultivated(?). West Indies.

19. **STIZOPHYLLUM** Miers

In part scandent with terete finely costulate branchlets (no gland-areas) that early are densely tomentulose as the petioles and petiolules. Stipules if apparent not large. Leaflets 3 or 2 (tendril simple or none), sometimes dentate, always conspicuously lepidote-punctate beneath. Inflorescence a short raceme, axillary or terminal. Calyx campanulate, membranous, more or less pubescent and inflated, costate, unevenly lobate. Corolla bright to pale yellow (Peru), purple or white, campanulate-funnelform, pubescent and lepidote without. Anthers glabrous, connective extended above the spreading cells. Disk shallowly cupulate-pulvinate. Ovary oblong, lepidote, ovules 2–4-seriate. Capsule very narrowly elongate-linear, valves parallel, smooth, long-attenuate, faintly ribbed. Seeds narrowly oblong, broadly membranous-alate.—*Adenocalymma* Mart., which is similar, may occur; it has yellow to white more or less pubescent flowers, the calyx in Peru, except *A. bracteolatum*, coriaceous, entire or split, usually glandular, connective sometimes little produced, ovules biseriate, capsule oblong-linear, thick, the ligneous valves smooth or tubercled, seeds rather round, more or less corky or oblong and membranously alate but nucleus always very thick (Sandwith).

Stizophyllum riparium (HBK.) Sandw. Lilloa 3: 462. 1938. *Bignonia riparia* HBK. Nov. Gen. & Sp. 3: 138. 1819; 220. *B. perforata* Cham. Linnaea 667. 1832. *S. inaequilaterum* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 221. 1896? *S. perforatum* (Cham.) Miers, Proc. Roy. Hort. Soc. 3: 197. 1863, form or variety, sens. lat. (Sandwith). *B. brevipes* Rusby, Bull. Torrey Club 27: 72. 1900, fide Sandwith.

Branches (subtetragonous or terete) more or less densely but often evanescently fulvous tomentose as the petioles and leaflets early beneath where punctate, glabrate above, finally also beneath except the nerves and the subparallel little reticulate veins, membranous, mostly not tendril-bearing, broadly ovate, obliquely rounded at base, rounded to the apiculate tip, the larger to about 1–1.5 dm. long, to nearly a dm. wide; racemes at most a few (–7) cm. long, terminal and axillary (Peru); pedicels to 9 mm. long; bracts linear, lacerate (type), villous, about 1–1.5 cm. long, acutely lobed about a third; corolla to 5 cm. long, scarcely 2-lipped, limb about 1.5 cm. wide or wider, somewhat villous; capsule 3–6 dm. long, hardly 6 mm. wide. —The Poeppig specimen is densely pellucid punctate; the taxon is well characterized by the long soft golden brown hairs on all parts, becoming woolly on branchlets, tendrils, inflorescences, calyx and corolla; quite possible that it is not more than an indumentum variety of a very variable collective species (*S. riparia*), including *S. perforatum* (Sandwith, Kew Bull. 1954: 607. 1955); most of the Peru collections are glabrate except Seibert's. Determinations, except *Schunke*, by Sandwith.

San Martín: Chazuta, *Klug 4115*. Juanjuí, *Klug 4274*.—Loreto: Yurimaguas, *Poeppig 1827* (type, *S. inaequilaterum*). Río Mazán, *José Schunke 315*. Mishuyacu, near Iquitos, *Klug 1092* (flowers bright yellow); *Klug 1458* (flowers white, both det. Sandwith). Chio, toward Aquaitia, *Seibert 1907*.—Madre de Díos: Iberia, *Seibert 1950; 2165*. Maldonado, *Seibert 2016*. Bolivia to Panama and Venezuela.

20. CALLICHLAMYS Miq.

Distinctive by the axillary shortly racemose (clustered) flowers with somewhat inflated calyces, these thin, glabrous and yellow (in part violet) as the funnelform corollas. Branchlets subterete, nodal glands none. Leaves trifoliolate or with simple tendril. Stipules undeveloped. Anthers glabrous. Ovary constricted above the broadly depressed pulvinate disk, ovules pluriseriate on each of the 2 placentae in each cell. Stigmas oblong-ligulate, acute. Capsule ellipsoid, minutely granular, medial nerve obsolete. Seeds oblong, the very wide membranous wings as body cinnamon in color.

Callichlamys latifolia (Rich.) Schum. in Pflanzenfam. 4, Abt. 3b: 223, *pl. 88*. 1894; 226. *Bignonia latifolia* Rich. Act. Soc. Hist. Nat. Paris 110. 1792.

Variable, tomentulose to glabrous or essentially, except puberulous racemes, the lenticellate branchlets more or less striate; leaflets ovate to ovate-oblong-elliptic, rounded, obtuse or acute at base, somewhat cuspidate-acuminate, 9–19 cm. long, 5–11 cm. wide, chartaceous, rather lustrous, minutely lepidote, finely and openly reticulate especially beneath, where granular punctate, the 6–8 pairs of nerves rather obvious; pedicels about 1 cm. long; calyx 3–4 cm. long, not or a little puberulous and with a few immersed glands; corolla 7–10 cm. long, bright yellow, sometimes crimson or violet, secund, the limb to 8 cm. across; capsule ligneous, about 2 (–3) dm. long, to 8 cm. broad, the seeds 2.5 cm. long, 6 cm. broad.

San Martín: Juanjuí, *Klug 4203* (det. Standley). Bolivia to Panama and Trinidad.

21. **PYROSTEGIA** Presl

Scandent, the upper leaves mostly 1–2-foliolate and with apically trifid tendrils. Stipules obscure. Calyx campanulate, entire or denticulate. Corolla tubular-funnelform, lightly curved, the subequal lobes valvate. Stamens exserted from corolla throat. Disk conspicuous, fleshy, subpulvinate. Ovary linear, ovules many. Capsule acute, glabrous, the nerve of the coriaceous valves obscure. Seeds elliptic, the membranous wings hyaline-edged.—Herbarium leaves paler beneath, brown or dark above.

Pyrostegia venusta (Ker-Gawl) Miers, Proc. Roy. Hort. Soc. 3: 188. 1863. *Bignonia venusta* Ker-Gawl, Bot. Reg. *pl. 249*. 1818; 159. *P. dichotoma* Miers, Proc. Roy. Hort. Soc. l.c.

Flowering branches obscurely striate-angled, glabrous or essentially (Peru) except for slight pulverulence on younger parts, the leaves distinctly punctate beneath; lower leaves 3-foliolate, the mostly bifoliolate upper often with a long medial tendril, rather stout, shortly trifid at apex; leaflets ovate- or oblong-elliptic, rounded or slightly acute at base, rather abruptly subcaudately and acutely acuminate, the larger about 7 cm. long, 3 cm. wide (petiolules 8–14 mm. long), paler green beneath, drying dark, subcoriaceous, the venation little prominent; calyx 5 mm. long, subtruncate, minutely denticulate, glabrous or nearly (in type, as corolla lobes, marginally villosulous ex char.); corolla narrowly tubular-funnelform, scarcely bilabiate, about 6 cm. long, the spreading suboblong acute lobes (aestivation valvate, DeCandolle) about 1 cm. long, half as wide,

finally exceeded by stamens and style.—*P. dichotoma* Miers was maintained by Bureau and Schumann, 230, on the basis of apically undulate calyx, ovules about 25 per cell, leaves rostrate, the panicle lax, 13–15 cm. long; in type *P. venusta* the dense panicles about 1 dm. long; it is not clear that these differences are more than a variation. The anthers, reflexed, are shown by Gomes, Rodriguésia 32: 130, *fig. 4*. Corolla brilliant pale orange-red, stigma white (Woytkowski). Branches serve as *piola*, i.e. *soguilla* (rope), Ferreyra. Illustrated, Argent. Inst. Bot. Agric. 10, fasc. 173: 33; Bot. Mag. *pl. 2050*. F.M. Neg. 26203 (*Spruce*).

San Martín: Tarapoto, *Woytkowski 35089* (det. Cuatrecasas); *Spruce 26203* (type, *P. dichotoma*); *Ferreyra 5070*.—Loreto: Balsapuerto, *Klug 2969* (det. Standley, *P. dichotoma*).—Madre de Díos: Iberia, *Seibert 1927; 1952* (det. collector). Paraguay; Brazil, and widely cultivated.

22. LUNDIA P. DC.

Scandent, the terete branches (subterete branchlets) often nodally glandular, the leaves trifoliate on the terminal leaflet or simple or trifid tendril. Pseudostipules scarcely obvious. Calyx campanulate, denticulate-truncate, sometimes split. Corolla pubescent or tomentose, campanulate-funnelform, the lobes often subequal. Anthers villous, cells spreading. Disk obsolete. Ovary as style and stigma pubescent or villous; ovules 2–6-seriate. Capsules linear, compressed, the smooth valves strongly 1-nerved, parallel to septum, the narrowly oblong thin seeds hyaline-alate (Sandwith).—Lund was a Danish botanist and entomologist who collected in Brazil.

Stamens included, but calyx sometimes split.
  Calyx scarious-margined, entire; filaments glabrous. *L. corymbifera.*
  Calyx not scarious above, often subdenticulate, rarely split.
    Flowers 5 cm. long; calyx lobed or truncate; filaments glabrous. *L. puberula.*
    Flowers shorter than 5 cm.; calyx denticulate; filaments puberulent ..... *L. Spruceana.*
Stamens exserted, or more or less visible ..... *L. cordata.*

Lundia cordata P. DC. Prodr. 9: 180. 1845; 243. *Bignonia longa* Vell. Fl. Flum. 6. *pl. 37;* text, ed. Netto, 249. 1824, not *L. longa*

P. DC., l.c. *Exsertanthera longa* (Vell.) Pichon, Bull. Soc. Bot. France 92: 226. 1945.

Slender younger branchlets more or less glandular at nodes and, as the inflorescence, leaves puberulent especially beneath; leaflets ovate or ovate-oblong, cordate at base, obtusely acuminate, about 1 dm. long, half as wide or smaller, rarely twice as large, usually drying dark, the 5–6 nerves and reticulate veins more prominent beneath; calyx cupulate-campanulate, yellow, 6–10 mm. long, subcoriaceous and puberulent below the unevenly splitting margin, this early minutely denticulate; corolla elongate-funnelform, crimson-red, subtomentose, 5.5–6 cm. long, longer stamens unequal, 3 cm. long, affixed 23–27 mm. above the base; filaments glabrous, anthers barbate; ovules 4-seriate.—An aberrant species in the presence of nodal glands, exserted stamens and extraordinarily reticulate pollen, the segregation of M. Pichon perhaps justifiable, at least logically. However, as to glands, areas of these are usually developed near nodes of specimens referred to *L. Spruceana* Bur. Capsule, according to Pichon, 11.5–42 cm. long, 9–25 mm. wide, valves acute, plane, coriaceous, smooth except the prominent midnerve; seeds large, broadly hyaline alate. Apparently unknown from Amazonian Brazil, the identification therefore rather questionable or the specimen incorrectly labeled. Illustrated, Rohrhofer, Oesterr. Bot. Zeitschr. 80. *pl. 3, figs. 5, 6* (anther, staminode).

Loreto: Yurimaguas, (*Poeppig 2008*, det. Bureau). Southern Brazil.

Lundia corymbifera (Vahl) Sandw. Recueil Trav. Bot. Néerl. 34: 229. 1937. *Bignonia corymbifera* Vahl, Eclog. Amer. 2: 45, *pl. 17*. 1798. *L. umbrosa* (HBK.) Bur. Adansonia 8: 282. 1868. *B. umbrosa* HBK. Nov. Gen. & Sp. 3: 138. 1819.

Branches sulcate, strongly compressed at nodes, finally glabrous, the younger terete, appressed fulvous puberulent as the axes, bracts, petioles—these striate, 4–6 cm. long—and calyces of the inflorescences; petioles 2–4 cm. long, sulcate above, tendril simple, often caducous; leaflets cordate-ovate (sometimes obtuse at base), long-acuminate, also subcaudate (acumen obtuse, mostly apiculate), 8–13 cm. long, 5–6.5 cm. wide, basally 5-plinerved, margin and nerves both sides more or less puberulent or the latter hirtellous beneath, sometimes glabrate; calyx scarious above, in anthesis transversely split, finally campanulate or shortly obconic and 5–7 mm. long; corolla white, 3–5 cm. long, velvety puberulent, the tube abruptly

dilated above the calyx, posteriorly convex, anteriorly 2-sulcate, glabrous within except around stamen insertion (this 6 or 7 mm. above base), lobes obovate, acuminate, puberulent both sides, the 2 posterior connate; fertile filaments glabrous, arcuate, anthers very hirsute; style glabrate or glabrous above; fruit (immature) 5 dm. long, 2 cm. broad, velutinous, the 4 or 6 ribs stout, rugose, obtuse, 2 acute; seeds complanate, 1 cm. long, 3–4 cm. wide, the pellucid wing 1.5 cm. long. —After Bureau. Leaves exceedingly soft, thin, velvety (Woytkowski). Most determinations by Standley. Illustrated, Bureau, l.c. 293, *pl. 6*. Oesterr. Bot. Zeitschr. 80. *pl. 3, figs. 7, 8* (flower).

San Martín: Zepelacio, *Klug 3562*. Tarapoto, *Woytkowski 35087* (det. Cuatrecasas).—Loreto: Fortaleza, Yurimaguas, *Klug 2796* (det. Sandwith).—Cuzco: Hacienda Santa Rosa, *Soukup 777*. Echarate, *Goodspeed Exped. 10505*. Brazil; Colombia.

Lundia puberula Pittier, Contr. U. S. Nat. Herb. 18: 258. 1917. *L. dicheilocalyx* Blake, Contr. Gray Herb. 52: 94. 1917, fide Sandwith.

Enlarged nodes and leaves (especially beneath on nerves) more or less puberulous; petioles 2–3 cm. long, petiolules 1.5–2 cm. long; leaflets 2, ovate, obliquely subcordate or emarginate at base, rather abruptly acuminate, 6–9 cm. long, 3–5 cm. wide, glabrate and sparsely glandular above or glabrous, finely reticulate; panicles terminal and axillary, many-flowered, puberulous as stems; calyx tubular, truncate, 5–6.5 mm. long, sometimes cleft; corolla pilose without, glabrous within (tube glandular, Blake), to 4.5 cm. long, lobes subequal; filaments glabrous, anthers barbate; anther cells long-ciliate, divaricate; ovary puberulent or tomentose, the ovules multiseriate. —Flowers bright lilac (*Klug*); tube white, lobes pale pink (*Killip & Smith*); latter specimen is in flower but complete.

Loreto: Mishuyacu, *Klug 45* (det. Sandwith, probably, spec. poor). Iquitos, *Killip & Smith 27149*. To Central America.

Lundia Spruceana Bur. Adansonia 8: 279. 1868.

Branches and slender rachises of thyrse subquadrate, glabrous but multiglandular at the compressed nodes; petioles 2.5 cm. long, glabrous as the bifoliate leaves and the apically trifid tendrils, the petiolules—these 1.5 cm. long—and the leaflets hirtellous, the latter marginally and on the nerves, especially above, the nerve axils barbate beneath; leaflets cordate-ovate, obtusely but apiculately acuminate, membranous, 5-plinerved at base, densely reticulate-veined beneath, 8 cm. long, 5 cm. wide; inflorescence lax, about equaling

the leaves, sometimes with a pair of branches at base; calyx long-campanulate, subtubular, 5–10-nerved, only the truncate minutely denticulate throat hirtellous; corolla white or yellowish or throat yellow, subcampanulate, appressed velutinous without, the oval lobes both sides, the tube below the stamens glandular puberulent, around them barbate, otherwise glabrous within; ovules 4-seriate in each cell.—With the tendrils of *L. densiflora* DC. with pilose leaves (ovules 6-seriate), the glabrate leaves of *L. erionema* DC. (ovules 4-seriate), its tendrils simple, both Amazonian species, possibly occurring in Peru. Most determinations by Standley. F.M. Neg. 32868.

San Martín: Zepelacio, *Klug 3539*. Juanjuí, *Klug 3885*. Tarapoto, *Spruce 4489*, type.—Huánuco: Tingo María, *Soukup 2200* (det. Killip).—Junín: La Merced, *Weberbauer*, 283.—Loreto: Balsapuerto, *Klug 2865*. Pongo de Manseriche, *Mexia 6227, 6372* (det. Sandwith). Mouth of Río Santiago, *Tessmann 4286*. Bolivia.

23. CYDISTA Miers

Scandent by simple tendrils, the more or less quadrate branchlets without nodal gland area. Leaves bifoliate; ultimate veins obvious; stipules if present foliaceous. Calyx campanulate, truncate, scarcely denticulate, sometimes unevenly lobed. Corolla funnelform, thinly lepidote. Anthers glabrous; cells divaricate. Disk obsolete. Ovary densely lepidote; style glabrous; ovules biseriate. Capsule compressed linear, the parallel valves smooth with thick raised margins, the medial nerve not prominent. Seeds semi-ellipsoid, much compressed, brown as the equally firm broad wings.—Corolla dorsally plicate longitudinally (Miers). Pollen grains not sulcate (Urban, Berichte Deutsch. Gesellsch. 34. 1916).

Cydista aequinoctialis (L.) Miers, Proc. Roy. Hort. Soc. 3: 191. 1863; 28. *Bignonia aequinoctialis* L. Sp. Pl. 623. 1753.

Glabrous except more or less lepidote including the flowers without and the capsules; branchlets lenticellate, finely striate and with 4 distinctly paler ribs; stipules rarely obvious, then subfoliaceous, spatulate; leaflets drying dark, ovate to oblong, elliptic or lanceolate, rounded (sometimes obtuse or subcordate) at base, acutely acuminate to cuspidate, then sometimes obtusely, to about 1.5 dm. long, half as wide, firm-chartaceous, lustrous above, minutely lepidote, the 6–8 pairs of lateral nerves as the intricate reticulation rather prominent (the former raised) both sides; racemes (or thyrse branches)

3-flowered at end branchlets, to 1.5 dm. long, the pedicels to 1.5 cm. long; bracts subulate, caducous, or calyx immersed glandular above the middle, 5–8 mm. long; corolla lilac or rose, the veins darker or white with mauve streaks, 4.5–8 cm. long, limb 4–6 cm. across, pubescent within; capsule 3–4 dm. long, 2–2.5 cm. broad, the seeds 2 cm. long, 3.5–4.5 cm. broad. Illustrated, Oesterr. Bot. Zeitschr. 80. *pl. 3, figs. 1, 2* (flower).

San Martín: Tarapoto, *Woytkowski 35009; 35013; 35018; 35022.* Juanjuí, *Klug 4268* (det. Standley).—Loreto: Mishuyacu near Iquitos, *Klug 594* (det. Sandwith, sens. lat.). To Central America and the West Indies. "Huacho-camote," "pacha-huasca," "machacu-huasca" (Woytkowski).

24. **ROENTGENIA** Urban

Like *Cydista* Miers but tendrils shortly trifid, veinlets (ultimate) impressed, seed wings membranous or papery, pollen grains plurisulcate, reticulate.—In several families (as Gentianaceae) the character of the pollen grains alone as a significant generic indicator has been disputed; it may be noted that the few other differences are relative or inconstant elsewhere in this family; this genus agrees with *Cydista* in the lepidote corolla and ovary and in the absence of disk, as noted by Sandwith; Urban based it chiefly on the trifid tendrils, many sulcate pollen grains, following a suggestion of Sprague.

Wilhelm Konrad Roentgen was a Nobel Prize winner, 1901 (Roentgen rays), also a humanitarian (Urban).

Roentgenia bracteomana (Schum.) Urban, Berichte Deutsch. Gesellsch. 34: 748. 1916. *Cydista bracteomana* Schum. Verh. Bot. Ver. Brandenb. 50: 121. 1908.

Upper stems and branchlets subquadrate, early and obscurely lepidote; tendrils coarse, several cm. long; leaves ovate to broadly elliptic, rounded or shortly acute at base, acuminate or rounded at apex, glabrous, drying brown, the 5 or 6 lateral nerves and veins prominent beneath, the larger 5–13 cm. wide, to 2 dm. long; inflorescences to 1.5 dm. long; bracts linear-apiculate, to 1 cm. long; calyx about 6 mm. long, lepidote as the funnelform corolla, this 5–6 cm. long, to 2 cm. across at apex, the rounded lobes about 1 cm. long. —Flowers white or lilac streaked; determinations by Sandwith.

Loreto: Florida, Río Zubineta, *Klug 2043; 2176.* Pongo de Manseriche, *Mexia 6320.* Yurimaguas, *Killip & Smith 28169.* "Goguio-o" (Klug). Brazil.

25. PHRYGANOCYDIA Mart.

Liana with bifoliolate leaves, these in younger branchlets with a simple tendril; adult stems quadrate, the younger often sparsely puberulent; tendrils filiform or stout, simple. Cymes 2–3-branched, bracted, glabrous in age including the flowers. Calyx clavate, large, soon spathaceously split and shortly somewhat inflexed cornute at apex, not at all lepidote. Corolla rosy-purple, funnelform-campanulate, lobes slightly unequal, imbricate, tube puberulent within. Disk obsolete. Stamens glabrous; anthers divaricate. Ovary lepidote, ovules many. Capsule linear-oblong, asperulous, valves coriaceous. Seeds oblong-linear, membranous wings white.

Phryganocydia corymbosa (Vent.) Bur. ex Schu. Pflanzenfam. 4, Abt. 3b: 224. 1894. *Spathodea corymbosa* Vent. Choix 40. 1803. *Macfadyena Bangii* Rusby, Bull. Torrey Club 27: 72. 1900, fide Sandwith. *M. corymbosa* Griseb. Bonplandia 6: 10. 1858.

Glabrous or glabrate, early hirtellous at nodes; leaflets lanceolate to ovate, acute to rounded to subcordate at base, somewhat acuminate, 7–15 cm. long, 3–9 cm. wide, lustrous, concolor, coriaceous, 7 pairs of nerves; tendril stout, elongated; flowers few to abundant, borne laxly along branchlets near ends; bracts filiform or narrow; calyx obliquely truncate, 2–2.5 cm. long, split laterally, tipped with short, very thick, incurved beak; corolla pink or blue, 6 or 7 cm. long, tube yellow, 5–5.8 cm. long, 1 cm. broad at apex, the limb strongly nerved, lobes 3 cm. long and broad; capsule 3–5 dm. long, 1.5–2 cm. broad.—Rusby's plant was collected at Ríos Beni and Madre de Díos in Bolivia and, as many specimens obtained there, doubtless occurs in adjacent Peru. Illustrated, Mart. Fl. Bras. 8, pt. 2: *pl. 100;* Oesterr. Bot. Zeitschrift. 80. *pl. 3, figs. 11, 13* (flower).

Madre de Díos (probably). Bolivia to Panama and Trinidad.

26. SALDANHAEA Bur.

Scandent, the branches subterete, the leaves mostly 3 (–5) foliolate, or conjugate and tendriled, the flowers many in short panicles on leafless branches. Calyx campanulate, dentate. Corolla funnelform, lobes subequal, imbricate. Disk fleshy, lobulate or subentire. Ovary (Peru) glandular-lepidote. Ovules 2–many-seriate. Style terete; filiform (Peru). Capsule elongate, valves convex, ligneous, rugose, dehiscing from base to apex. Seeds compressed, lacerately alate at each end.—Pollen nearly smooth and in tetrads.

Saldanhaea lateriflora (Mart.) Bur. Adans. 8: 355, *pls. 11, 12.* 1867–68. *Tecoma lateriflora* Mart. in Flora 24. Beibl. 2: 51. 1841. *Cuspidaria? lateriflora* (Mart.) DC. Prodr. 9: 179. 1845.

Branchlets lenticellate, early puberulent as leaves, at least on the nerves beneath, the membranous bracts—these 3–4 mm. long—and calyces, these 4 mm. long with shallow sinus between narrow teeth about 1 mm. long; leaflets ovate-oblong to elliptic, rounded, truncate or subcordate at base, acutely and shortly acuminate, the lateral 4–5 cm. long, 3–4 cm. wide, papyraceous or firmer, drying olive-green, fulvous-margined, usually with 5 rather prominent nerves; peduncles slender or filiform, a cm. long or longer; calyx subrubescent, glabrous within except at apex; corolla narrowly funnelform, purple-violet (Brazil), about 2.5–3 cm. long, tomentulose as crisped lobes within, pubescent near insertion of included stamens, the anther cells curving; capsule somewhat rugose; seeds oblong-linear.—The young pods are quadrate, mature 4.5 dm. long or longer, 13 mm. wide, medially sulcate. Flowers lavender, shrubby tree or liana (Seibert). Illustrated, Mart. Fl. Bras. 8, pt. 2: *pl. 101;* Oesterr. Bot. Zeitschrift. 80. *pl. 3, figs. 14, 15* (flower).

Madre de Díos: Iberia, Río Tahuamanu, (*Seibert 1922*). Brazil.

27. XYLOPHRAGMA Sprague

Scandent, branches subterete, leaves mostly trifoliate. Panicles typically on older leafless branchlets. Calyx tubular, truncate, more or less unevenly lobed or cleft in age. Corolla funnelform, puberulent within at stamen insertion. Anther cells nearly horizontally divaricate. Style quadrate. Disk cupulate. Ovules 6–8-seriate. Fruit valves ligneous, thick, broad, finally longitudinally parting.—The fruit is thus quite different from that of *Saldanhaea;* besides, the anther cells are straight, young style quadrate, ovules many.

As in *Stizophyllum* the flowers may be yellow. Pollen grains monads with three colpae distinguishing this genus sharply from *Saldanhaea,* whose pollen grains are united into tetrads (author). This, as many genera, rests on the interpretation of the salient characters whether of generic or sectional import. Similar pollen characters are present in other families, as in Gentianaceae.

Indument, especially younger parts, yellow, as corolla.
X. xanthophylla.
Indument canescent; corolla not yellow.....*X. pratense.*

Xylophragma pratense [Poepp.] Sprague, Hook. Icones 28. *pl. 2770.* 1903. *Saldanhaea pratensis* [Poepp.] Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 256. 1896. *Bignonia pratensis* [Poepp.] ex Bur. & Sch. l.c. *Tecoma pratensis* [Poepp.] Schum. in Pflanzenfam. 3, Abt. 43b: 229. 1891.

Branches defoliate, nodally dilated, puberulent early, obscurely lenticellate; leaflets 3, ovate or elliptic, obtuse at base, shortly obtusely acuminate, glabrous, coriaceous, subconcolor, larger about 12 cm. long, 7.5–8.5 cm. wide, 8–9 nerves prominent on both sides; panicles 1–1.5 dm. long, cinereous puberulent; calyx to 1 cm. long, medially cleft on one side, puberulent; corolla canescent without, sparsely puberulous within near stamen insertion, 5 cm. long, lobes 7 mm. long; disk cupulate; ovary sparsely lepidote; style quadrate; capsules oblong, subtuberculate, to about 13 cm. long, 3 cm. broad. —Flowers lilac and cream-colored (Klug); purple (Spruce) with scent of Primrose, the stem 4 dm. in diameter. F.M. Neg. 3287.

San Martín: Juanjuí, *Klug 3847* (det. Standley). Tarapoto, (*Spruce 4232*).—Loreto: Yurimaguas, *Poeppig 2316*, type. Bolivia; Brazil.

Xylophragma xanthophylla (Bur. & Sch.) Macbr., comb. nov. *Arrabidaea xanthophylla* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 70. 1896. *Tabebuia? xanthophylla* [Mart.] DC. Prodr. 9: 214. 1845. *Phryganocydia xanthophylla* Mart. in herb. fide P. DC.

Trunk to 6.5 cm. thick, much branched, high-ascending, early puberulent, overall color yellowish-orange, glabrate or glabrous except the leaves beneath, and the large terminal lax panicles tomentulose; leaflets ovate or broadly elliptic, the lateral ordinarily oblique, all acute or cordate at base, shortly or long-acuminate, or rostrate, more or less conspicuously 5-nerved with subreticulate transverse veins prominent especially beneath, discolored, herbaceous, often 5–9 cm. wide, 9–11 cm. long; panicles 1.5–2.5 dm. long; bracts and bractlets to 18 mm. long; calyx tubulo-turbinate, unequally 2–3-lobed, not at all laccate (varnished), 10–12 mm. long; corolla yellow, funnelform, pilosulous at stamen insertion; disk subcupular; ovary lepidote, ovules many, often 4(?) or many-seriate; capsule compressed, tuberculate-rugose (Martius).—Thought to be related to *A. rubrinervis* Miers; Pichon, Bull. Soc. Bot. France 92: 224. 1945, observed that this species, known to him only from description, is distinct generically by the yellow indument, trifid tendrils, tubercu-

late capsules; it may belong to *Scobinaria* Seibert. Klug determinations by Standley. Type from near Río Japura, Brazil.

San Martín: Zepelacio, *Klug 3507*. Juanjuí, *Klug 3910*.—Loreto: Río Mazán, *José Schunke 127* (det. Seibert). Florida, *Klug 2007*. Near Iquitos, *Klug 606*. Río Santiago, *Mexia 6315*. Echarate, 900 meters, *Vargas 10456*. Upper Amazonian Brazil.

28. **MEMORA** Miers

Branchlets terete, without nodal glands or impermanent ribs. Petioles and petiolules tumid at both ends. Leaves (unless uppermost) pinnate to tripinnate or biternate, the simple or trifid tendril often developed instead of the third basal or terminal pinnae; uppermost leaves sometimes bi-trifoliolate (former with tendril); compare observation below. Stipules minute or obsolete (Miers) or (others) usually foliaceous, patellate-glandular. Calyx coriaceous or membranous, if campanulate, truncate-denticulate, if subtubular, variously split and lobed. Corolla yellow, funnelform or rather campanulate and long-cylindric below, glabrous as the divaricate celled anthers. Disk thick, annular-pulvinate. Ovary glabrous or lepidote, ovules biseriate. Capsule elongate-linear, compressed, the parallel valves smooth. Seeds oblong, membranous with whitish hyaline wings or almost entirely corky (Miers). At present the only satisfactory characters by which *Memora* can be separated from *Adenocalymma* are the pinnate or bipinnate leaves (except the uppermost!) and the glabrous (without) corolla, and the latter character breaks down in the instance of *A. impressum* (Sandwith, l.c. 212, cf. note under *Pseudocalymma*) who also observes (and renames to *Adenocalymma*) a Suriname species (*A. bilabiatum* (Sprague) Sandw.) with all leaves bi-trifoliolate, pollen exine discolored in those areas just where the furrows of a trisulcate pollen grain would be expected!

The late A. J. Sampaio, Anais Prim. Sul-Amer. Bot. Río de Janeiro 3: 149–170. 1938, gave a key and synopsis of Brazilian species, especially helpful for his discussion of generic definition and relationship.

Calyx truncate-denticulate, subcoriaceous; leaves glabrous above. *M. flavida.*

Calyx unevenly lobed or cleft.

Calyx usually coriaceous; leaflets glabrate or glabrous.

Venation obscure or impressed above; corolla 6–9 cm. long, tube elongate, slender..... *M. Schomburgkii.*

Venation raised above (in Peru); corolla usually shorter, tube short, ampliate ..... *M. patula.*

Calyx membranous; leaflets pubescent (type) ..... *M. magnifica.*

Memora flavida (P. DC.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 264. 1896. *Bignonia flavida* P. DC. 9: 168. 1845. *Pleonotoma flavida* (P. DC.) Miers, Proc. Roy. Hort. Soc. 3: 185. 1863. *M. Duckei* A. Samp. Anais Prim. Sul-Amer. Bot. Río de Janeiro 3: 169. 1938.

Scandent or decumbent, the slender subquadrate branches strongly dilated at nodes, early lepidote as the younger racemes or panicles, these 6 cm. long, often from older wood, with complanate peduncles, pedicels (1 cm. long), minute subulate bracts, bractlets; tendril when present shortly trifurcate (on the conjugate leaves); leaflets oblong (terminal subovate-oblong, petiolulate), acute, 3–11 cm. long, 2.5–5 cm. wide or larger, glabrous above, impressed glandular punctate beneath; stipules oblong-subulate, obtuse, to 6 mm. long; calyx truncate, coriaceous, glandular, 8 or 9 mm. long; corolla subcampanulate, 4–5.5 cm. long, tube 1.5 cm. long, lobes 15–17 mm. long, glabrous or within pilosulous, without typically glandular above, coriaceous; disk cupulate; ovary lepidote; ovules 9 per cell.—Corolla of *M. Duckei* described as eglandular; *Mexia 6417* referred by Standley in herb. to *Adenocalymma*, n. sp., named after collector.

San Martín: Juanjuí, *Klug 4353* (det. Standley); *Klug 3878* (det. Standley, n. sp., named after collector).—Loreto: Mishuyacu, *Klug 403* (det. Seibert). Rancho Indiana, Iquitos, *Mexia 6417*. Brazil.

Memora magnifica (Mart.) Bur. Vidensk. Meddels. Naturh. Foren. 106. 1893. *Adenocalymma magnificum* Mart. ex DC. Prodr. 9: 202. 1845.

Stout, teretely branched, vegetatively puberulent at least early, especially the leaflets beneath; leaflets shortly petiolulate, rounded at base, shortly and acutely acuminate, 7–10 cm. long, 3–7.5 cm. wide, or those of pinnate leaves sometimes twice as large or larger, nerves 6–9, immersed above, joined with reticulate veins beneath, not punctate-pellucid, subconcolor; stipules often foliaceous, 5–6 mm. long, sparsely glandular; racemes terminal, subcorymbose; bracts oblong, acuminate, tomentulose, glandular as the unevenly 3–4-lobed and cleft calyces, these 13–15 mm. long; corolla orange-yellow, 5.5–7 (–10) cm. long, tube 2.5–3 cm. long, lobes short, crisped, pubescent only within at stamen insertion; ovary tetragonous, glabrous; ovules 24 per cell.—Differs from *M. Schomburgkii* (DC.) Miers in

its pubescent leaflets and short corolla lobes (Sandwith); the Peruvian specimen not seen.

Loreto: Yurimaguas, (*Poeppig 2128*, fide Schumann). Amazonian Brazil.

Memora patula Miers, Proc. Roy. Hort. Soc. 4: 161. 1864.

Obscurely quadrate branches rugulose, leaves conjugate pinnate, sometimes with tendril 1 dm. long or longer; primary petioles (as petiolules) nodose at both ends; leaflets 2–3 pairs, narrowly oblong, sublinear at apex, about 1 dm. long, 3–4 cm. wide, glabrous, subcoriaceous, light green above, paler beneath, granulate-rugose, nerves and veins prominent, reticulate; racemes subequaling petiole, or about 4 cm. long; pedicels 4–6 mm. long, the 2 bracts 6–8 mm. long; calyx tubular, 12 mm. long, 8 mm. in diameter, oblique, cleft and denticulate; corolla glabrous in and out, the tube about 3 cm. long, lobes 18 mm. long, 14 mm. broad; filaments pilose-tufted at base; anther cells reflexing.—Differs, fide Sandwith, from *M. Schomburgkii* in raised leaf venation; fide author, in its longer acuminate leaflets more acute at base, more nodose petioles, smaller flowers. Most of the specimens referred by me to *M. Schomburgkii* have been determined by Sandwith as a form of this species.

Loreto: Mishuyacu, *Klug 51; 539* (form or variety with larger bracts, bracteoles, calyces, Sandwith). Río Mazán, *Schunke 78*. Colombia (Río Magdalena).

Memora Schomburgkii (DC.) Miers, Proc. Roy. Hort. Soc. 3: 185. 1863; 51. *Spathodea Schomburgkii* DC. Prodr. 9: 207. 1845. *Tanaecium ovatum* [Klotzsch] Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 187. 1896. *M. ovata* (Bur. & Sch.) Sprague & Sandw. Kew Bull. 93. 1932, fide Sandwith.

Glabrous or nearly, or glabrate, or the leaf nerves minutely puberulous as the young inflorescence, this shorter than 5 cm.; lenticels not prominent; pseudostipules to 7 mm. long; leaves usually simple imparipinnate, 5–7-foliolate, some biternate, the uppermost mostly bifoliolate; leaflets of the lower (pinnate) leaves oblong-lanceolate, cuneate to obtuse or rounded at base, acuminate, to 2 dm. long or longer, 8 cm. wide or narrower, the uppermost much smaller, all thin-coriaceous, venation obscure or impressed above, intricate beneath; bracts and bractlets ovate, small; pedicels usually 5–10 mm. long; calyx unevenly lobed and split, about 1.5–2.5 cm. long, soon glabrate, more or less immersed black-glandular, also often punctate

and lepidote near base; corolla pale yellow, 6–9 cm. long, the narrowly cylindric tube elongate, the glabrous limb to 6 cm. across; disk conspicuous, pulvinate; ovary sparsely lepidote; capsule longer than 5 dm., nearly 4 cm. broad, the dark (dried) valves obtuse or shortly acuminate, the medial nerve scarcely defined; seeds trapeziform, brown, completely corky, 3 cm. long, 4–5 cm. broad.—Mention may be made here of Sandwith's detailed elucidation of the identity of *Memora fulgens* Bur. since the var. *elongata* Bur. is a true *Memora*, in the group of forms centered around *M. Schomburgkii*.

Loreto: Balsapuerto, *Klug 2964* (det. Sandwith). Iquitos, *Killip & Smith 27220*. Mishuyacu, *Killip & Smith 29941; Klug 819*. Río Santiago, *Tessmann 4186* (distr. as *M. magnifica*). To Colombia and Guiana.

29. **PLEONOTOMA** Miers

Branchlets notably quadrate, the acute angles well-defined as detachable ribs; nodal gland areas obsolete; scandent by trifid tendrils, these often supplanting the third basal pinnae of the biternate or ternate-bipinnate leaves; stipules little obvious or foliaceous (type). Calyx cylindric or campanulate, subcoriaceous, truncate-denticulate, immersed scutellate glandular. Corolla narrowly campanulate-funnelform or hypocrateriform, the tube quite glabrous without or glandular, scurfy and lepidote in the upper half, the limb glandular pubescent and lepidote. Anthers glabrous, cells divergent. Disk pulvinate to subcupulate. Ovary lepidote or pubescent; ovules biseriate. Capsule linear, compressed, smooth, the nerve usually inconspicuous, the oblong seeds with broad membranous wings.—Petioles, petiolules tumid at each end (type). Herbarium leaves light brown. *P. jasminifolium* (HBK.) Miers of northern Amazon has in part triternate leaves and the pinnae compound.

Calyx to 5 mm. long.....*P. clematis.*
Calyx to 9 mm. long.....*P. Brittonii.*

Pleonotoma Brittonii Rusby, Bull. Torr. Bot. Club 27: 72. 1900. *P. auriculata* Schum. ex Sprague, Verh. Bot. Ver. Brandenb. 50: 122. 1909, fide Sandwith, Kew Bull. 438. 1959.

Glabrous; stipules about 2 cm. long and wide, nervose, leaves 2 dm. long and wide, with 3 pairs of pinnae (one of lowest a tendril); leaflets ovate, rounded at base, abruptly and acutely short-acuminate, 2.5–6 cm. long, about 1–3 cm. wide, the petiolulate terminal

one much larger; venation slender, rather obvious beneath; panicles (type) 5 or 6 cm. long, loosely flowered, the pedicels to 1 cm. long; calyx oblong, entire or obscurely denticulate, 8 mm. long; basal part of corolla tube 1.5 cm. long, 3.5 mm. broad, abruptly expanded to portion 3 cm. long, 16 mm. broad, the spreading apex 4 cm. across. —Capsule with valves 3.5 dm. long, just over 2.5 cm. broad in La Paz (Bolivia) specimen, determination by Siebert, *P. jasminifolia* (HBK.) Miers; Klug specimen distributed by Standley as *P. Uleanum* Kränzl. (Sandwith, l.c.).

San Martín: Juanjuí, *Klug 3378*.—Loreto: Balsapuerto, *Klug 2996*. Bolivia; Brazil.

Pleonotoma clematis (HBK.) Miers, Proc. Roy. Hort. Soc. 3: 184. 1863; 31. *Bignonia clematis* HBK. Nov. Gen. & Sp. 3: 141. 1819. *P. Uleanum* Kränzl. Notizbl. Bot. Gart. Berlin 6: 378. 1915, fide Sandwith.

Punctate-lepidote and mostly glabrous except bracts, bractlets and the leaves on midnerve above puberulous, rarely pilosulous all over, especially beneath; pseudostipules oblong-spathulate or linear, shorter than 1 cm., upper half multi-scutellate glandular; leaves rather ovate or lanceolate, rounded (sometimes cordate) at base, conspicuously acuminate, a few to 10 cm. long or longer, 1.5–4.5 cm. wide, chartaceous, lustrous, the intricate reticulation prominent; racemes often corymbose, rarely with cymose lower branches, 2–7 cm. long; bracts narrow, 2.5 mm. long or sometimes foliaceous and compound; pedicels mostly 1–1.5 cm. long; calyx merely ciliolate, 2.5–5 mm. long, to 5 mm. across; corolla yellow, yellowish or white with yellow or pinkish throat, 2.5–5 cm. long, the tube glabrous nearly to apex, within at stamen insertion (below middle) pubescent, lepidote and glandular, the scurfy pubescent and glandular limb (especially inside) to 3 cm. across; ovary lepidote; style glabrous; capsule linear, long-attenuate, almost 3.5 dm. long, 1 cm. broad, smooth, minutely lepidote, the midrib scarcely or slightly marked; seeds narrowly oblong, 7–10 mm. long, 3–3.5 cm. broad, entirely gray.—After Sandwith (as most descriptions), who describes the capsule from apparently conspecific Venezuelan material from near type locality; the Peruvian material referred, however, by both Standley and Cuatrecasas to Kränzlin's species. Woytkowski ("fruit like a centavo") may have had fruit from a similar species (as *Pyrostegia?*). Kränzlin separates his species from *P. variabile* Miers on the basis of whitish angles and dark stem. *P. clematis* has smaller calyx, much narrower

capsule, and often, thrice ternately pinnate leaves; those of Miers' species all simply biternate (6 foliolate) with or without a tendril (Sandwith).

San Martín: Tarapoto, *Woytkowski 35006*. Venezuela, British Guiana, Brazil. "Sic-sic-huasca," "sacha-centavo," "cortadera-huasca," (all, Woytkowski).

30. MACFADYENA A. DC.

Microbignonia Kränzl. Notizbl. Bot. Gart. Berlin 6: 380. 1915?

Slender subterete nodally glandular branchlets supported by rather stout subclavately 3-hamate tendrils, terminating the normally bifoliolate leaves. Stipules subulate-lanceolate. Flowers pedicellate, one to several in the axils. Calyx spathe-like, cleft about medially, or more or less bilabiate, the midrib of the posterior sepal shortly produced. Corolla funnelform, glabrous (also within) as anthers, these with connective extended. Disk variously low-pulvinate. Ovary oblong-linear, ovules 2–4-seriate. Capsule compressed, smooth valves parallel, medial nerve thin, subelevated. Seeds basally truncate, upper margin curved, wings as body firm.—J. Macfadyen, a physician for whom the genus is named, wrote *The Flora of Jamaica* (1837).

The plant described by Kränzlin as *M. auristellae* from a vegetative scrap is obviously a juvenile state, possibly in this family and then most likely this genus; cf. Sandwith, Fl. Suriname 4, pt. 2: 66. 1938, who describes a similar condition (but leaflets lobed) and I. M. Johnston (many forms of an apparently juvenile state), for the following species. Juvenile states are known also for *Doxantha* and *Glaziovia*, the last from near Río Janeiro, the small leaves bilobed as in *Bauhinia*. Since simple, serrate, lobate-serrate and bifoliate leaves have been noted it seems herbarium material could be, in Peru, either *Macfadyena* or *Doxantha*.

Macfadyena uncata (Andr.) Sprague & Sandw. Recueil Trav. Bot. Néerl. 34: 215. 1937; 291. *Bignonia uncata* Andr. Bot. Rep. *pl. 530*. 1808.

Branches finely striate (glabrous or essentially, as entire plant unless early); leaflets typically papyraceous, obtusely subcuneate at base, acutely caudate, to 14 cm. long, 6 cm. wide, sparsely impressed glandular beneath—as membranous calyx, this to 2.5 cm. long—

lepidote-punctate, lateral nerves 6–10 pairs, open venation obvious (type); inflorescence to 2 cm. long; calyx 1.5–2 (2.5) cm. long; corolla yellow, 5–7.5 cm. long, limb to 3.5 cm. across; ovary sparsely lepidote, ovules biseriate; capsule attenuate at both ends, finally to about 2.5 dm. long, 2 cm. broad, seeds to 17 mm. long, 4 cm. broad. —(After Sandwith as to the Guiana plant). Amazonian material seen may have subcoriaceous leaves, obscure venation and perhaps is distinct at least varietally. Another river-bank species, *M. mollis* (Sond.) Seem., known from Brazil to Central America, may be recognized, if found, by its puberulous capitately glandular leaves.

Junín: Pichis Trail, *Killip & Smith 25544* (det. Killip). Near Perené Bridge, repent on trees, *Killip & Smith 25305* (probably juvenile state).—Loreto: Santa Rosa, appressed on trunks, *Killip & Smith 28930* (probably). Río Huallaga, *Killip & Smith 29249* (det. Killip). Aguaitia, *Woytkowski 34465* (det. Cuatrecasas with query, *Stizophyllum perforatum*).—Río Acre, (type, *Microbignonia*). To Mexico and the West Indies.

31. **DOXANTHA** Miers

Branches terete, leaves conjugate, the entire or serrate leaflets separated early by a slender trifid tendril, each fork uncate, calloused. Flowers showy, yellow, solitary or several in the axils. Calyx membranous, campanulate, truncate to crisped crenulate. Corolla short-funnelform. Stamens included, staminodium linear, elongate. Disk annular. Ovules many. Style filiform, stigma broad, membranous. Capsule elongate, linear, the valves coriaceous, the long seeds alate. —Stipules small or obscure; juvenile state with much reduced leaves sometimes puberulent; similar forms have been observed for *Macfadyena* and apparently they are not surely recognizable as to genus. This species was retained by Bureau and Schumann in *Bignonia*.

Doxantha unguis-cati (L.) Miers, Proc. Roy. Hort. Soc. 3: 190. 1863. *Bignonia unguis-cati* L. Sp. Pl. 623. 1753. *Batocydia unguis* (L.) Mart. ex Britton, Mem. Brooklyn Bot. Gard. 1: 90. 1918.

Leaves about ovate-elliptic, obtuse or acute, to 5 or 6 cm. long; peduncles slender, 1–3 cm. long; calyx 1–1.5 cm. long, smooth or nearly; corolla 5–8 cm. long; capsules several dm. long, 12–14 mm. broad; seeds 2–3 cm. long, alate at each end.—*D. exoleta* (Vell.) Miers, Brazilian, has puberulent or glabrate slightly serrulate leaflets, many flowers, calyx crisped. Apparently established (or native) as

found in groups on rising ground (Schunke). Lima Botanical Garden (Seibert). Illustrated, Mart. Fl. Bras. 8, pt. 2: *pl. 105.*

Loreto: Gamitanacocha, Río Mazán, *José Schunke 317.* Aguaitia, *Woytkowski 34465* (distr. as *Stizophyllum perforatum*). South and Central America. "Una de Gato," "mashuricra," "mashushio" (Schunke).

32. JACARANDA Juss.

Handsome shrubs or trees, attractive in outline and foliage—leaves in Peru abruptly bipinnate with many leaflets—and in flower often strikingly colorful, the widely funnelform bluish-mauve blossoms—in Peruvian species the tints softened by a grayish indument—usually borne abundantly and gracefully in terminal (or also axillary) panicles on many leafy or leafless branchlets. Pseudostipules obsolete or not apparent. Calyx subtubular or cupulate, truncate or openly cupulate and acutely dentate. Corolla sometimes glabrous. Stamens (fertile) short, the anthers in most species with only one fertile cell, the staminode elongate. Disk pulvinate or stoutly stipiform. Ovary ovoid-ellipsoid, usually glabrous as the style, the ovules pluriseriate. Capsule ligneous, compressed, loculicidal, the valves at right angles to the narrow septum, this parting longitudinally. Seeds broadly elliptic or suborbicular, the hyaline wings usually incomplete at point of attachment to flattened placenta processes (Sandwith).

Leaflets very numerous, small (to 2 cm. long), the leaves thus rather fern-like; anther cells unequal.

Leaflets ovate-oblong; ovary (type) tomentose; capsule suboblong. *J. obtusifolia.*

Leaflets oblong-linear; ovary glabrous; capsule disciform. *J. acutifolia.*

Leaflets about 20 or fewer, mostly 3 cm. long or longer; capsules suboblong.

Anther cells unequal; panicles terminal.....*J. copaia.*

Anther cells equal; panicles usually at leafless nodes....*J. glabra.*

Jacaranda acutifolia Humb. & Bonpl. Pl. Aequin. 1: 59, *pl. 17.* 1806 (fide Journ. Bot. 39: 203. 1901); 391.

Glabrous or essentially except the more or less sericeous corollas; petioles canaliculate, partially alate; pinnae 6–12 pairs, the lance-

olate acuminate entire leaflets many, reticulation indistinct above (dried); calyx 2.5–3.5 mm. long, with subequal teeth, these 0.5–2 mm. long; corolla with a white stripe within, the tube straight; capsule rounded-ovate, shortly and acutely cuspidate, 2.5 (3.5) –4 cm. long; seeds to 1.1 cm. long, 2–2.3 cm. broad.—Bark smooth, 12 meters or more. Flowers appear after the leaves fall (Weberbauer) as shown by my collections; corolla purplish with 2 white stripes within, the tree on barren rocky slopes (Woytkowski).

Ruiz and Pavón found the bark used in anti-venereal decoctions, vessels made from the wood to supply anti-rheumatic drinking water, and the leaves powdered to heal cleansed sores. Mathews found it cultivated as a medicinal plant in the valley of Lima; Nation collected fruits on the Río Huallaga. *J. mimosifolia* D. Don of Argentina, often cultivated in the tropics, while similar has leaves (except the uppermost) with more than 12 pinnae, leaflet reticulation very obvious, calyx at most 2.5 mm. long, teeth often less than 1 mm. long and the capsule 4.5–6 cm. broad (Sandwith, Kew Bull. 1953: 456. 1954). F.M. 39402.

Amazonas: Valley of the Marañón, *Weberbauer 109;* 109.—Huánuco: Near Huánuco, *Dombey; Ruiz & Pavón; Woytkowski 103; Seibert 1826* (det. Seibert); *1363* (flowers); *Sandeman 3495* (det. Sandwith).—Junín: Western rocky slope, Huertas, *1344* (fruit, leaves). "Yaravisco" (Dombey), "paravisco."

Jacaranda copaia (Aublet) D. Don, Edinb. Phil. Journ. 9: 267. 1823; 76. *Bignonia copaia* Aublet, Pl. Guian. 2: 650, *pls. 262, 265.* 1775.

Glabrous or glabrescent, the leaflet midrib beneath slightly puberulent, the candelabra-like inflorescence pubescent and lepidote as the calyx, the corolla stellate pubescent, especially without; branchlets abundantly and minutely lenticellate; leaf-rachis merely angled, that of the pinnae (5 pairs or fewer) not alate; leaflets few, to 20 or more on each pinna, obliquely elliptic, oblong or somewhat obovate, cuneate at base, often unequally (typically) obtusely rounded, usually 2.5–7 (10) cm. long, 1.5–3.5 cm. wide, firm-chartaceous, ordinarily nitid, punctate-lepidote, subconcolor, the prominent lateral nerves 5–7 on each side; panicles borne among the leaves; calyx 4–6 mm. long, truncate or obtusely and broadly lobed; corolla 2.5–4.5 cm. long, the limb to 2.5 cm. across; staminode with apical tuft of long trichomes, densely long-pilose below a short glabrous area; disk pulvinate; capsule rounded apically, 10–16 cm. long,

5.5–9 cm. broad, nearly smooth or closely rugulose; seeds rather suborbicular, to 2.5 cm. long, 4 cm. wide.—Often taller than 30 meters (Sandwith); develops an unbranched trunk. Compare *J. rhombifolia* G. F. W. Meyer (*J. filicifolia* D. Don; fide Sandwith), to which the following collections may belong. (*Klug 1469*, det. Sandwith), Mishuyacu, has 8–12 pairs of pinnae, lateral leaflets rarely longer than 1.5 cm., calyx shallowly cupulate, acutely deltoid-dentate, corolla glabrous without; ovary glabrous. Williams, Field Mus. Bot. 15: 446. 1936, referred with query specimens *4140, 4345, 6488* to *J. filicifolia* D. Don. The var. *spectabilis* (Aublet) Bur. has more rhombic, obtusely cuspidate leaflets, stamens glabrous at base. Illustrated, Oesterr. Bot. Zeitschrift. 80, *pl. 6, figs. 3, 4* (staminode).

San Martín: Lamas, *Williams 6488*. Moyobamba, *Weberbauer*, 289. Zepelacio, *Klug 3732* (det. Seibert, var. *spectabilis*).—Huánuco: Valley of the Monzon, *Weberbauer*, 285. Boqueron, *Woytkowski 34414* (det. Cuatrecasas).—Loreto: Lower Itaya, *Williams 220* (distr. as *J. filicifolia*). Yurimaguas, *Killip & Smith 29118; Williams 4140?* Near Iquitos, *Klug 3732* (det. Seibert, var. *spectabilis*). Fortaleza, *Williams 4345? Klug 114*. Nicaragua, Panama and rain forests of northern South America. "Amchiponga" (Williams), "aspingo," "ishtápi," "paravisco," "solimán de monte" (Record).

Jacaranda glabra (DC.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 394. 1896; 434. *Pteropodium glabrum* DC. Prodr. 9: 239. 1845. *J. cauliflora* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 373. 1896. *J. rachidoptera* Bur. & Sch. l.c. 374. *J. intermedia* Huber, Bol. Mus. Goeldi 4: 608. 1906 (not Sonder, 1849). *J. longiflora* Britton ex Rusby, Bull. Torrey Bot. Club 27: 73. 1900. *J. atropurpurea* Rusby, Mem. N. Y. Bot. Gard. 7: 357. 1927 (last two names, fide Sandwith, Kew Bull. 434. 1959).

Type with petioles of glabrous leaves partially alate between the leaflets, in other forms scarcely or not at all; panicles lateral from leafless older branchlets, short and few-flowered to a dm. long or longer; leaflets sessile or subsessile, oblong to subrhombic, obtuse to acuminate, glabrous to glandular and puberulent, the lateral often several cm. long, sometimes smaller or strongly unequal; calyx tubular campanulate, more or less and unevenly denticulate to lobulate, 6–9 mm. long, pilosulous to glabrate; corolla 5–7 cm. long; capsules oblong, stiped, 5–12 cm. long, 3–5 cm. broad, valves plane or carinate especially below; seeds 2–3.5 cm. long, 12–16 mm.

wide, the wings pale or castaneous.—Sandwith, l.c., noted that when variability within the species is proven by ample material, all six species will probably be united. However, Cuatrecasas, as Dugand, referred Colombian specimens to *J. rachidoptera*. Huber indicated that *J. cauliflora* might include the Peruvian trees; indument, winged to wingless rachis, flower color and constancy of inflorescence on old wood are characters variable in many groups. F.M. Negs. 26193; 32863; 39968.

San Martín: Tarapoto, *Spruce 26192; 4893* (type, *J. rachidoptera*). Juanjuí, *Klug 3763* (*J. intermedia*, fide Standley).—Huánuco: Pozuzo, *Ruiz & Pavón* (det. Schumann, *J. cauliflora*).—Loreto: Yurimaguas, *Poeppig 1987* (type, *J. cauliflora*); *Seibert 1941*. Inchua, *Soukup 3007*. "Paraivisco," "carruagero."

Jacaranda obtusifolia Humb. & Bonpl. Pl. Aequin. 1: 62, *pl. 18*. 1805. *J. lasiogyne* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 385. 1896, probably, fide Sandwith, Kew Bull. 1953: 458. 1954.

Glabrous except the nodally axillary precocious panicles, these obscurely pulverulent unless the corollas, the staminode villous at base and apex, the ovary tomentose; branches dark with flavescent lenticels; rachis of the many pinnae more or less continuously alate, the innumerable sessile lateral leaflets obliquely oblong or ovate-oblong, obtuse or subobtuse, 7–12 mm. long, 3–5 mm. wide below the middle, 3–5-nerved, pallid beneath, the terminal 1.5–2 cm. long, 3–5 mm. wide; rachis of panicles 2–2.5 cm. long, pedicels 2–4 mm. long (to 8 mm. in fruit), bracts and bractlets 1 mm. long; calyx broadly cupulate, repand (ex char.), 1–1.5 mm. long; corolla campanulate-funnelform, curved at contracted base, globose-inflated below, about 4 cm. long; capsule oblong, impressed-punctate, obtuse- or retuse-cuspidate, 5–6 cm. long, 2– nearly 3 cm. broad; seeds 15–22 mm. broad, 8–10 mm. long, equally or somewhat unequally alate.—*J. obtusifolia* Humb. & Bonpl., said by Schumann to be similar to *J. lasiogyne*, has, ex char., colored 5-dentate calyces. The description is after Bureau and Schumann for their species; the latter's determination of *J. Trianae* Kränzl. as *J. lasiogyne* (photograph therefore distributed as that, fide Schumann, naturally *not* as to type!) was an error, for it was *J. caucana* Pittier, calyx 5-lobed (Sandwith, Kew Bull. 1953: 457. 1954). Sandwith concludes: I very strongly suspect that *J. lasiogyne* is only a form of *J. obtusifolia* with glabrous leaflets; the var. *rhombifolia* (G. F. W. Meyer) Sandwith, l.c., has the ovary glabrous! Some of these proposed species, it seems, have

few constant characters. Cowan discovered that the ovary of *J. obtusifolia* (type, Paris) is also tomentose. The Klug specimen was from an 8-meter tree with light to dark blue flowers, the ovary tomentose!

Loreto: Río Zubineta, *Klug 2288* (det. Seibert). Colombia.

33. ARGYLIA D. Don

Perennial herbs from thick fleshy roots, the alternate petioled leaves distinctively radiately digitate with 7–9 incised-pinnatifid leaflets. Peduncles axillary, terminating in a bracteate raceme of yellow or purple flowers. Calyx equally 5-parted. Corolla tubular at base, ventricose at throat, the slightly bilabiate limb with broadly rounded lobes. Fifth stamen rudimentary. Anthers barbate, cells spreading. Stigma bilamellate. Capsule compressed, 2-celled, ovules biseriate, valves at right angles, seeds membranous-margined, obscurely alate.

Argylia radiata (L.) D. Don, Edinb. Phil. Journ. 9: 261. 1823. *Bignonia radiata* L. Sp. Pl. 871. 1753. *A. Feuillei* DC. Prodr. 9: 235. 1845. *A. eremophila* Phil. Linnaea 33: 180. 1864. *A. puberula* of Phil. Fl. Atacam. 36. 1860; Viage Des. Atacam. 12, 16, 38, 210. 1860, fide Johnst. Contr. Gray Herb. 85: 117. 1929.

The only species; the leaflets that are borne together at the apex of petioles 1–1.5 dm. long are suboblong and vary in each leaf from 4–8 cm. long or longer, about 2 cm. wide or narrower; calyx glandular hirsutulous, about 8 mm. long; corolla yellow, 5 cm. long, early puberulent, the tube scarcely 3 mm. thick, the abruptly dilated throat to 2 cm. across; capsules acuminate, about 6 cm. long, 5 mm. wide.—A very variable plant; forms or similar species occur in Chile; Feuillée's, the basis of *A. radiata* as well as *A. Feuillei* DC. was collected at a latitude about that at Ilo, Peru, according to Feuillée, Journ. Obs. Phys. 2: 731, *pl. 22*. 1714 (Johnston). Illustrated, Weberbauer, 140. F.M. Neg. 26181.

Arequipa: Mollendo, *Weberbauer*, 144; *Guenther & Buchtien 76; Eyerdam 25161*. Lomas de Camaná, *Ferreyra 2548*. In loose rocks south of Mollendo, *Mexia 04174; 7772* (det. Killip). Atiquipa, *Worth & Morrison 15626*. Chile.

34. CAMPSIS Lour.

Deciduous stems terete, climbing by aerial rootlets, the leaves imparipinnate, the orange-red flowers in terminal clusters or panicles.

Calyx tubular campanulate, coriaceous. Stamens 4, 2 longer, anthers divaricate. Disk large. Fruit loculicidally dehiscent, the 2 valves separating from the seed-bearing septum, the many seeds with 2 large hyaline wings.—Perhaps *Tecoma;* yet the original *Bignonia* L. was largely based on this plant; it is one of the popular Trumpet Vines of horticulture.

Campsis radicans (L.) Seem. Journ. Bot. 5: 372. 1867. *Bignonia radicans* L. Sp. Pl. 871. 1753.

Leaflets 9–11, acuminate, serrulate, pale and pubescent beneath; flowers in terminal racemes, tubular-funnelform, 7 cm. long with 5 spreading lobes, usually orange with scarlet limb; calyx denticulate; fruit cylindric, oblong, keeled, rostate, 1 dm. long or longer.—Illustrated, Bot. Mag. *pl. 485;* Bailey, Cycl. Hort. 1: 651, *fig. 773.*

Lima: Botanical Garden, *Seibert 2332.* Eastern United States to Texas and Florida.

35. TECOMA Juss.

Stenolobium D. Don, Edinb. Phil. Journ. 9: 267. 1823.

Like *Tabebuia* but in Peru shrubs or trees expediently separable by imparipinnate leaves, rarely on young shoots, in part or all simple, if with 3 leaflets the lateral smaller. Racemes or panicles terminal or upper-axillary. Corolla pubescent or papillate within.—As suggested by DeCandolle, Prodr. 9: 212. 1845, seems quite arbitrarily restricted and the earlier name, this abbreviated from the usual native one of Mexico. Unlike *Jacaranda* in the short inconspicuous staminode, the much longer stamens (both anther cells fertile) glabrous or pilose, included or exserted.

The more common Andean species are medium-sized trees characteristic, with *Schinus molle* and *Caesalpinia tinctoria,* of the dryer coastal and inter-Andean regions and with the same range (Weberbauer). Spruce noted native names "Tauari" and "Carajuru" and "Carajuru piranga," while Poeppig in his famous *Reise* mentioned probable species as "Ambira;" Williams interpreted the first name as "Ta huari" (amarillo y negro).

Melchior, Berichte. Deutsch. Gesellsch. 59: 18–31. 1941, defined section *Eutecoma* Melch., l.c., corolla tube laterally somewhat inflated, cylindric only slightly above the calyx, that rather abruptly but definitely broader, bell-like above, the difference notable; stamens included, anther cells pilose, glandular pubescence at base of

filaments. In Peru this section includes the first four species of the following key, which is nevertheless expedient, the often obvious distinctions being apparently questionable as to constancy and true significance.

Leaves simple or in part 3-foliolate, ample; leaflets acuminate; stamens included; calyx 3–4 mm. long.
Corollas about 2.5–4 cm. long, 1 cm. wide at apex. *T. Weberbaueriana.*
Corollas (3) 3.5–4 cm. long, 12–15 mm. wide..... *T. castanifolia.*
Leaves normally all pinnate except *T. tanaeciiflora*, the leaflets several to many (*T. stans*, *T. rosaefolia* often have 1 or few simple leaves).
Leaflets several, somewhat to much longer than wide.
Corollas broadly funnelform, more or less abruptly expanded above short tube, often 2–3 cm. wide or wider at apex; stamens included.
Leaves rather ovate to lanceolate-linear, usually acutely acuminate..... *T. stans.*
Leaves (at least lateral) oblong or elliptic.
Leaflets usually acute, at least half as wide as long. *T. sambucifolia.*
Leaflets (lateral) often obtuse, usually narrow. *T. rosaefolia.*
Corollas tubular or narrowly funnelform; anthers usually visible.
Calyx subcampanulate.
Leaflets clearly serrulate, often pubescent.... *T. rosaefolia.*
Leaflets subentire or crenulate, glabrous..... *T. guarume.*
Calyx cylindric, suboblong.
Puberulence lacking.
Leaflets truncate or obtuse..... *T. arequipensis.*
Leaflets acute to acuminate..... *T. cochabambensis.*
Puberulence uniform..... *T. tanaeciiflora.*
Leaflets many, small, rounded..... *T. fulva.*

Tecoma arequipensis (Sprague) Sandw. Kew Bull. 1953: 454. 1954. *Stenolobium arequipense* Sprague, Bot. Jahrb. 42: 177. 1909.

Erect glabrous shrub or small tree to 8 meters tall (Balls), the quadrate (dark) branchlets 2–3 mm. thick, internodes to 1 dm. long;

leaf rachis narrowly alate, internodes 7–15 mm. long, leaflets (2–4) 6–9 pairs, sessile or alately petiolulate, oblong-obovate, 1–2.5 cm. long, 5–10 mm. wide (the single terminal one larger), rather coarsely 5–8-serrate, as to type subtruncate or rounded at apex, impressed punctate, glaucous both sides, the 4–6 nerves obscure; racemes 1–2 dm. long, puberulent or glabrescent; pedicels 5–8 mm. long; calyx 6–9 mm. long, ciliate, acuminate lobes 1–1.5 mm. long; corolla tubular-funnelform, scarlet (Balls) or orange-scarlet (Seibert), brownish-red or orange, 5–7 cm. long; style slightly exserted, filaments for 2 cm. adnate, part glandular villous, free, 2–2.5 cm.; ovary lepidote, ovules 21–22 per series.—Specimens by Lord Colchester and Warszewicz referred by Seemann to *T. fulva* Cav. belong here, from which *arequipensis* differs in its larger obovate leaflets (author). F.M. Neg. 26210.

Ica: Near Ica, (*Maclean*).—Cuzco: Limatambo, Abancay, *Balls 6839* (det. McVaugh). Prov. Anta, 2,700 meters, *Vargas 129* (cultivated).—Arequipa: Mt. Chiwata, *Eyerdam & Beetle 22127* (det. Johnston). Port Lomas, *Weberbauer 5731*. Tingo, *Pennell 13125*. Chancani, 2,300 meters, *Weberbauer 1430*, type; *128; 129*. Lower slopes of Mt. Misti, *Sandeman 3750; Hinkley 31* (det. Sandwith, distr. as *T. garrocha* Hieron.).—Moquehua: Near Moquehua, 1,400 meters, *Weberbauer 7448*. Cultivated, Lima Botanic Garden, *Seibert 2093; 2327* (det. collector). "Pichus" (West), "cabuato" (Weberbauer).

Tecoma castanifolia (D. Don) Melchior, Berichte Deutsch. Gesellsch. 59: 26. 1941. *Stenolobium castanifolium* D. Don, Edinb. Phil. Journ. 9: 264 (not 263). 1823. *Bignonia castaneaefolia* (D. Don) DC. Prodr. 9: 145. 1845. *T. Gaudichaudii* DC. l.c. 223, fide Melchior. *S. stans* (L.) Juss. var. *castaneaefolium* (D. Don) Seem. Journ. Bot. 1: 88. 1863.

Glabrous or the leaves especially when young weakly to densely pubescent beneath with stellate trichomes; leaves oblong-elliptic, acute or the leaflets of trifoliate leaves acuminate, the lateral typically smaller than the medial, this often 1.5–2.5 dm. long, 6–9 cm. wide; panicles typically spiciform (Don) or branched (in Peru simple or subsimple); calyx 3–4 mm. long, 2–2.5 mm. broad (Melchior), equally 5-dentate; corolla 3.5 to 3.8 cm. long, width (in herb.) 12 mm. (or broader); tube 1–1.5 mm. broad, two and a half to three times longer than calyx (Melchior); capsules 2 cm. long (Don).—The glabrous state (*T. Gaudichaudii*) is part of type collection by Tafalla

(Ruiz & Pavón Exped.) from Guayaquil (Melchior). F.M. Neg. 26207.

Piura: Talara, *Haught 102* (det. Melchior, *T. Weberbaueriana*). Chulucanas, *Soukup 4196*. Ecuador.

Tecoma cochabambensis (Herzog) Sandw. Kew Bull. 1953: 455. 1954. *Stenolobium cochabambense* Herzog, Meded. Bot. Mus. Rijksuniv. Utrecht 29: 42. 1916.

Similar to *T. arequipensis* and *T. guarume* and perhaps with the former correctly a part of the latter but the leaflets (in type, 4 pairs) distinctly acute or acuminate, closely and minutely serrate, to 4.5 cm. long, scarcely 1 cm. wide; calyx (type) 5 mm. long, teeth scarcely longer than 1 mm.; corolla to 5 cm. long.—Distinctly separated from *T. arequipensis* by the small elongate leaflets (author), a scarcely constant character. Illustrated, Oesterr. Bot. Zeitschrift. 80. *pl. 7, figs. 1–5* (flower).

Ica: Pompanos, 1,200 meters, *Vargas 9301* (det. Johnston, *T. arequipensis*).—Ayacucho: Toward Huanta, *Weberbauer 5666*. Near Ayacucho, *West 3676* (det. Johnston, *T. arequipensis*, vel valde aff.). Bolivia. "Cahuato" (Vargas), "pichus" (West).

Tecoma fulva (Cav.) D. Don, Gen. Syst. 4: 224. 1838. *Bignonia fulva* Cav. Icones 6: 672, *pl. 580*. 1799. *Tecomaria fulvum* (Cav.) Seem. Journ. Bot. 1: 19. 1863. *Stenolobium fulvum* (Cav.) Sprague, Fl. Capensis 4, pt. 2: 448. 1904. *Bignonia Meyeniana* Schauer, Nov. Act. Leop. Nat. Cur. 19, suppl. 1: 363. 1843.

Subtetragonous, younger branchlets and leaves villous hirtellous, purpurescent, glabrous in age; leaves with alate rachis, the many (8–10 pairs) leaflets subsessile, cuneate-ovate, rounded, 4–6 mm. long or longer, serrate toward apex; racemes terminal or axillary, 7–9-flowered; pedicels puberulous; calyx glabrous or villous (Cavanilles), acutely dentate; corolla to about 5 cm. long, red in part, yellow, and, at base, villosulous within, the tube slender, somewhat curved, the limb little bilabiate, marginally puberulent; stamens, style, slightly exserted, spurred or mucronate (Hooker); capsule similar to that of *T. stans* (DeCandolle).—*T. arequipensis* (Sprague) has larger obovate leaflets (author); type from Arica by Née. Shrub 3–4 meters tall, the basally deep red corollas passing into orange above (Metcalf). Illustrated, Bot. Mag. *pl. 4896*.

Tacna: In the mountains at 700 meters, *Meyen* (type, *B. Meyeniana*). Near Tacna, (*Metcalf*). Bolivia. "Chuvé" (Née).

Tecoma guarume DC. Prodr. 9: 224. 1845.

Glabrous shrub, branches purpurescent, petioles alate; leaves 5 pairs of oblong dentate leaflets nearly 2.5 cm. long, 10–16 mm. wide, the terminal little larger, sometimes confluently 2–3-lobed; peduncles axillary in a lax terminal many-flowered panicle; calyx glabrous, acutely 5-lobed.—In open inflorescence and alate leaf rachis, this plant in Herb. Delessert per label on Negative 26210 is type rather than the Herb. Prodromus specimen (Negative 7675) by Dombey, which appeared to me to be the form of *T. rosaefolia* HBK. with obtuse leaflets. Sandwith does not refer to this specimen in his useful paper, Candollea 7: 243–254. 1936, on some Candollean types. The following collection, which may prove to be a variant, has acute obscurely serrate leaflets, corollas 3.5–6 cm. long, calyces campanulate. Really, unless the calyx shape is significant, the recorded differences between this and *T. arequipensis* and similarly distinguished plants seem tenuous and probably within a normal range of variation. F.M. Neg. 26210.

Ica: Río de Pisco, *Vargas 930* (det. Johnston, *T. arequipensis*). "Cabuato" (Vargas).

Tecoma rosaefolia HBK. Nov. Gen. & Sp. 3: 112 (144). 1819. *T. azaleiflora* HBK. l.c. fide Seemann, l.c. *B. tenuiflora* DC. Prodr. 9: 166. 1845, fide Seemann. *Tecomaria roseifolia* (HBK.) Seem. Journ. Bot. 1: 20. 1863. *Gelseminum amoenum* Ktze. Rev. Gen. 3, pt. 2: 245. 1898 (fide Sandwith with query). *Stenolobium huancabambae* Kränzl. Bot. Jahrb. 54, Beibl. 119: 23. 1916.

More or less pubescent to nearly glabrous shrub, the brown bark fragile; leaflets 2–4 pairs, oblong, obtuse or acute, serrate, partly pilose beneath only, lateral to 3 cm. long, half as wide, terminal to 1 dm. long; rachis sometimes compressed, glabrous or as petioles, puberulent; calyx nearly minute, 3 × 3 mm. (type), usually somewhat longer but campanulate, denticulate; corolla outside red, narrowly short-tubular at base (where villous within), funnelform, bilabiate, 5.5 cm. long, 1 cm. across at top; stamens to 6 cm. long; disk fleshy, crenate; capsule 1–1.5 dm. long, 4–6 mm. broad.—Type from Ecuador, the flowers 2.5 cm. long, those of *T. azaleiflora* 3.5 cm. long, filaments glabrous in both these types. Sandwith, Kew Bull. 432. 1959, remarked that material seen in Peru and Ecuador suggests that this is a very variable species, especially in the indumentum; he indicates he is inclined to believe the synonymy of Seemann and to add the plants of Kuntze and Kränzlin (this ex char.), and perhaps others

(Bolivian). The Dombey specimen in Herb. Prodromus under the name *T. guarume* DC. is, ex char., rather *T. rosaefolia* HBK., while Neg. 26210, if a Pavón specimen, Herb. Conservatoire, is, ex char., the type of *T. guarume*. The unequal yellowish to brownish-red color of the flowers is difficult to describe (Weberbauer).

Piura: Sondrillo, Río Huancabamba, (*Bonpland*, type, *T. azaleiflora*. Río Huancabamba, *Weberbauer 6279* (type, *S. huancabambae*). —Cajamarca: Chota to Hualgayoc, 1,300–2,300 meters, *Weberbauer*, 188. Socota, *Stork & Horton 10096*.—Amazonas: Utcubamba Valley, *Weberbauer*, 191. Chachapoyas, (*Mathews 1339*).—Arequipa: Chuqarapi, (*Guenther & Buchtien 565*, det. Bruns). Bolivia to Ecuador. "Fresno," "fresnillo," "hada."

Tecoma sambucifolia HBK. Nov. Gen. & Sp. 3: 143. 1819. *Stenolobium sambucifolium* (HBK.) Seem. Journ. Bot. 1: 88. 1863.

Glabrous tree, the branches compressed; leaves imparipinnate, terminal, simple, intermixed, the leaflets (2) 3–5 pairs, oblong (acute or obtuse), acuminate, serrate, reticulation venose, nerves prominent beneath, lustrous above, lateral leaflets 3.5 cm. long, 1.5 cm. wide; panicles terminal, simple, less than 1 dm. long (type); calyx campanulate, acutely dentate; corolla funnelform, 2.5–3.5 cm. long; anthers puberulent (Melchior); ovary glabrous; capsule 1 dm. long, compressed, verruculose, glabrous; seeds flat, membranous-margined.—Rather distinct from *T. stans* in the form of the leaves (HBK.), a questionable distinction; no specimens seen by me at this time (1960). The acuminate leaflets contrast with *T. rosaefolia* HBK. (Sandwith). *Killip & Smith 21780* shows rounded or obtuse leaflets and acutely acuminate ones. New shoots may have simple leaves (Melchior). There is a var. *multijugum* R. E. Fries, type from Argentina; this plant is certainly a part of *T. stans* (Herzog), an opinion shared by me. Type from Montan, Peru (Bonpland). Flowers yellow with orange tinge (*Seibert 2092*, cultivated at Lima Botanic Garden). At its northern limit ascends to 3,000 meters, while found at 1,600 meters in the south (Weberbauer). Illustrated, Weberbauer, page 157.

La Libertad: Santiago de Chuco, *Lopez 0431* (distr. as *T. guarume*).—Cajamarca: Huaraz, *Weberbauer*, 172, 173.—Lima: Matucana, *Stork & Horton 9131; Soukup 2068; Mexia 04081*. Canta Valley, below Obrajillo, (*Cruckshank*).—Huánuco: Ambo, (*Asplund 13506*, det. Asplund).—Junín: Tarma, *Killip & Smith 21780; Weberbauer*, 177; *Seibert 2198* (det. Seibert).—Cuzco: Vilcanota Valley, (*Herrera 1079*, det. Killip). Valle de Urubamba, *Weberbauer*, 175;

243. Ollantaitambo, (*Cook & Gilbert 300; 808*). At 2,750 meters, *Herrera 949*.—Arequipa: Mejia, (*Guenther & Buchtien*). "Huaranhuai," (Weberbauer).

Tecoma stans (L.) Juss. Gen. Pl. 139. 1789; 79. *Bignonia stans* L. Sp. Pl. ed. 2. 871. 1763. *Stenolobium stans* (L.) Seem. Journ. Bot. 1: 88. 1863.

Flowers without, except branchlets, petioles and subterete leaf rachis glabrous (except variety), unevenly, remotely and minutely lepidote; leaves punctate beneath, the midrib pilose; leaflets 1–3 pairs, lanceolate, acutely serrate and acuminate, cuneate at base, several cm. to a dm. long, 1–4 cm. wide, the veins impressed above, lateral nerves prominent beneath, chartaceous; racemes (panicles, also) usually 0.5–1.5 dm. long; calyx 4.5–7 mm. long, 2.5–3.5 wide, the upper half impressed glandular, only the short deltoid acute lobes ciliate; corolla yellow, 3.5–5 cm. long, the tube 2–3 mm. broad, at most twice as long as calyx (Melchior), the limb to 3.5 cm. across; stamens included, anther cells (ex char.) pilosulous; capsule glabrous but often densely yellow-lenticellate and a dm. or so long, to 7 mm. broad.—Variable in degree of indument, none to dense when worthy of recognition as var. *velutina* DC. Prodr. 9: 224. 1845 (*T. mollis* HBK. l.c.), fide Seibert. However, Melchior, Berichte Deutsch. Gesellsch. 59: 26. 1941, suggested that lightly pubescent shrubs have inflorescence of *T. stans* (simple or nearly), tomentose ones that of *T. castanifolia* (as *T. sorbifolia* HBK.) and so are probably distinct. Originally from Mexico, may be not native in Peru or should include several variants described as distinct species. A shrub or small tree (rarely 8 meters) commonly cultivated, as at Lima, for the beauty of its bright yellow flowers over long periods, the flexible branches used in basketry. Jussieu did not give the source of the name (not required in his day), so I consider the transfer as by him (as did Schumann, Hooker, DeCandolle and others) rather than by Humboldt, Bonpland and Kunth. Illustrated, Bot. Mag. *pl. 3191;* Bureau, Monogr. Bignon. *pl. 13* (1864).

Cajamarca: Huambos, Prov. Cutervo, *Stork & Horton 10200* (var. *velutina*, det. Standley, *T. mollis*).—Lima: Lima, *Soukup 2927*. Surco, *Soukup 3742*.—Huánuco: Conchamarca, *Soukup 133*. Tingo María, *Allard 21619* (det. L. B. Smith).—Junín: Tarma, *Ruiz & Pavón; Ochoa 638* (det. L. B. Smith).—Huancavelica: Shrubland, Mejorada, *Stork & Horton 10897* (det. Standley).—Apurímac: Pincos, *Stork & Horton 10684*. Oropeza Valley, (*Vargas 9761*). At 2,500 meters, *Weberbauer*

5846 (var. *velutina*).—Cuzco: Valle de Urubamba, near Calca, *Herrera 738; 1089; Soukup 62* (var. *velutina*). Abancay, *Balls 6883* (det. McVaugh). Florida to Mexico and Argentina. "Ciarhirachero" (Ruiz & Pavón), "huaranhua" (Herrera).

Tecoma tanaeciiflora (Kränzl.) Sandw. Kew Bull. 1953: 455. 1954. *Stenolobium tanaeciiflorum* Kränzl. Bot. Jahrb. 54, Beibl. 119: 22. 1916.

Much branched, about 3 meters tall, the dark gray branchlets short-pilose as the short racemes and leaves, these pinnate or simple, the latter cuneate-oblong, acute, dentate, about 1–5 cm. long, 10–13 mm. wide; calyx oblong, 5-costate, 5 mm. long, pilosulous as the lobes marginally of the glabrous corolla, this to 6 cm. long, gradually ampliate from very slender base, slightly curved, the lobes 6 or 7 mm. wide, 4–5 mm. long; stamens on pilose part of tube 1 cm. long, filaments glabrous; ovary 5–6 mm. long; capsule smooth, arcuate, to 7 cm. long, attenuate into disk 1 cm. long.—Stafford collections agree with original description; pinnate and simple leaves on the same branchlets. Weberbauer noted a form with pinnate leaves; these have 3–7 leaflets. Some simple leaves are 7 cm. long, 3 cm. wide. It is clear that the taxonomy of the Peruvian and Bolivian species of *Tecoma* can be understood only from field studies (Sandwith).

Arequipa: Below Chuquibamba, (*Stafford 1174*); toward same locality, *Weberbauer 6844*, type. Quebrada Molle, north of Arequipa, (*Stafford 1145*). Aplao, 1,400 meters, Hafen von Lomas, *Weberbauer 5731?; 6844*.

Tecoma Weberbaueriana (Kränzl.) Melchior, Berichte Deutsch. Gesellsch. 59: 26. 1941. *Stenolobium Weberbauerianum* Kränzl. Bot. Jahrb. 54, Beibl. 119: 23. 1916.

Type a 3 meter high shrub with densely lenticellate bark and, fide author, very much like *T. stans* but differs in the leaves and smaller flowers; all of the former seen by him were trifoliolate, not truly pilosulous but puberulent, the larger middle one to 1.5 dm. long, 4–6 cm. wide, the 2 lateral 6–8 cm. long, 1–2.5 cm. wide, all coarsely dentate; flowers in racemes or in few-branched panicles to 12 cm. long, sometimes with a few small leaves below; bracts minute, linear; pedicels 5 mm. long; calyx shortly campanulate, deeply parted, the triangular acute teeth 2–3 mm. long; corolla to 4 cm. long (author), 2.5 cm. long in specimen seen, abruptly expanded from narrow base,

straight, the equal rounded lobes pilosulous only within, marginally fimbriolate; anther cells strongly divergent, the larger 2 cm. long; style 2 cm. long; disk minute.—There are also simple leaves. If distinct from *T. castanifolia* (D. Don) Melchior it must be on the basis of much narrower flowers, much less inflated, and rarely more than 3 cm. long; it is probably a pubescent state of *T. Gaudichaudii* and correctly included with it in *T. castanifolia* (D. Don) Melchior.

Piura: East of Piura, in rain-shrub area, 300 meters, *Weberbauer 6005*, type.

36. TABEBUIA Gómes

Trees with simple, 1-foliolate or digitately and subequally 3–5-foliolate leaves (no pseudostipules) and short terminal or axillary dichasia or racemes. Calyx campanulate to elongate-tubular, clearly lobed, often bilabiately, lepidote, stellate pubescent or tomentulose. Corolla about funnelform, rarely subhypocrateriform, the lobes usually ciliate, frequently pubescent within. Anthers glabrous, cells divaricate, the sterile one much shorter. Disk patelliform or cupulate. Ovary rather oblong, usually lepidote, the ovules commonly pluriseriate, sometimes biseriate. Capsule elongate-linear or narrowly oblong-ellipsoid, attenuate both ends, often beaked at apex, the smooth valves at right angles to septum. Seeds oblong, the hyaline wings whitish or suborbicular and entirely coriaceous.—The name is a native one for the species first known (from Río Janeiro); several species are cultivated in Argentina. Unless for convenience, a part of *Tecoma* Juss.

To this genus Williams, Field Mus. Bot. 15: 447. 1936, referred, without specific determination, from Tarapoto, his *5736*, *6617*, from Yurimaguas, *4435*, Pebas, *1881*, and La Victoria, *3176*, collections not seen. Dugand, Mutisia 25: 1–22. 1956, has given a helpful key and notes to the species of Colombia, with references to the wood. If "*T. pentaphylla*" (cf. authors, not L., nom. illegit., Sandwith) is in Peru it must be called *T. rosea* (Bertol.) DC. Prodr. 9: 215. 1845 (*Tecoma rosea* Bertol. Fl. Guatimal. 25. 1840), famous for its wood known as "Roble morado;" the 5-digitate leaves and calyx are densely lepidote. It is in Ecuador! (Sandwith, Kew Bull. 1953: 454. 1954).

Tecomaria capensis (Spach) Seem., the exserted stamens with anther cells connate for the upper third may be cultivated (as elsewhere in South America), from Africa; leaflets 7–9, serrate, pubescent, 1.5–3 cm. long, corolla orange-red or scarlet, glabrous, 4–5 cm. long;

Seibert collected it at the Lima Botanic Garden (*2094*) and at Fortaleza, Loreto (*2178*) as an ornamental.

Leaves closely stellate-canescent and reticulate beneath; corolla pilosulous ventrally within ..... *T. heteropoda.*

Leaves soon glabrate or greenish beneath, not strongly reticulate.

Corolla weakly long-pilosulous within; leaflets 3, ultimate veinlets not raised beneath (typically) ..... *T. serratifolia.*

Corolla pubescence coarser; leaflets usually 5–7, ultimate veins raised.

Leaflets early pubescent; corolla indument within subscurfy. *T. obscura.*

Leaflets early glabrate; corolla indument softer (type). *T. capitata.*

Tabebuia capitata (Bur. & Sch.) Sandw. Recueil Trav. Bot. Néerl. 34: 226. 1937. *Tecoma capitata* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 337. 1896.

Ex. char. similar to *T. obscura* but according to authors inflorescence precocious; leaflets sometimes 3, sometimes acute; calyx about 1 cm. long, subtomentose floccose, apically incrassate, 5-dentate; corolla 4.7–5 cm. long (type), ventrally pubescent within; disk cupulate, 0.6 mm. high; ovary lepidote.—Probably will be found to vary in character of indument sufficiently to include *T. obscura.* A river shore tree 30–40 meters high, flowers bright reddish-lilac according to Asplund, who referred his collection to the Argentinian *T. Avellanedae* Lorentz & Griseb. Goeth. Abh. 24: 258. 1879, i.e. *T. ipe* (Mart.) Standley.

Huánuco: Tingo María, *Asplund 12620.* Divisoria, 1,700 meters, *Woytkowski 34566* (det. Cuatrecasas). Amazonian Brazil.

Tabebuia heteropoda (DC.) Sandw. Kew Bull. 1953: 452. 1954; 333. *Tecoma heteropoda* DC. Prodr. 9: 219. 1845. *Tecoma grandiceps* Kränzl. Repert. Sp. Nov. 17: 216. 1921.

Branches terete, soon glabrate, the younger as petioles and leaves beneath canescently stellate-tomentose; leaflets 5, oval, elliptic or subobovate, often 8–12 cm. long, 4–9 cm. wide, coriaceous, glabrescent and impressed punctate above except hirsute midnerve, reticulate, the 2 lateral subsessile; flowers densely racemose-corymbose at tip of older branchlets; bracts and bractlets subulate, 4 mm. long;

calyx tomentose or glabrate, slightly lepidote, teeth puberulous or villous; corolla tube glabrous, the limb puberulent apically and within ventrally sparsely short- or long-pilosulous; ovary lepidote.—Kränzlin's type was from a leafless tree, branches torulose-cicatrose, glabrous, corolla sparsely paleaceous-pilose within, to 8 cm. long, 6–7 cm. across apically; ovary sulcate, glabrous. The inflorescence is separate on Pavón's type, also on duplicate sheet at Geneva; the calyx is lepidote, and Sandwith wondered if the material belongs to one species, the branches and leaflets densely pubescent with branched trichomes; perhaps type in fact is *T. capitata*, but the flowers, often precocious, are then on separate twigs. *T. Hassleri* Sprague, Bull. Herb. Boiss. 2. 5: 87. 1905, appears to be comparable if not a variant. F.M. Neg. 26212.

Cajamarca: Río Llaucan, Prov. Cutervo, *Weberbauer 7166*.—Huánuco: Pozuzo, *Ruiz & Pavón* (type, without data).—Cuzco: Pomachaca, Urubamba Valley, 1,200 meters, *Weberbauer 5050* (type, *Tecoma grandiceps*). "Guayacan" (Weberbauer).

Tabebuia obscura (Bur. & Sch.) Sandw. Recueil Trav. Bot. Néerl. 34: 226. 1937. *Tecoma obscura* Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 343. 1896.

Branches compressed quadrate at dilated nodes, early subtomentulose as petioles, leaf nerves beneath and terminal subsessile umbellate inflorescence; leaflets 5, oblong, obtuse or obtusely acuminate, stellate pubescent and impressed lepidote on both sides, subcoriaceous, subnitid above, often 8–10 cm. long, 3.5–4 cm. wide, lateral nerves 9–11, transverse veins prominent; bractlets linear-subulate, acuminate; calyx rusty, 1–2 cm. long, tube campanulate, splitting unequally, usually 3-dentate; corolla about 6–6.5 cm. long, glabrous without, ventrally puberulous within, lobes rounded, 14 mm. long; disk low; ovary glabrous.—Inflorescence accompanied by leaves (Schumann), perhaps not constantly; also said to be distinguished from *T. capitata* (Bur. & Sch.) Sandw. l.c. (to be expected in southeastern Peru) by the clearly stellate pubescent younger leaflets (both sides), very rusty calyx, and, especially, shorter almost scurfy rigid trichomes on anterior inner side of corolla tube; the also similar *T. serratifolia* (Vahl) Nicholson has corollas less densely and weakly long-pilose within; the ovary of *T. capitata* (perhaps *T. obscura*) may lack the flat glands very obvious on that of Vahl's plant (Sandwith). All these characters, from the few specimens seen, may, it seems to me, prove variable.

Loreto: La Chorrera, (*Fox 41*, det. Sandwith). Iquitos, *Tessmann 5144; Klug 476* (det. Sandwith). Boquerón, Padre Abad, *Woytkowski 34417* (det. Cuatrecasas, *T. longiflora* Bur. ined.). Northern Amazonian Brazil.

Tabebuia serratifolia (Vahl) Nicholson, Dict. Gard. 4: 1. 1888; 73. *Bignonia serratifolia* Vahl, Eclog. Amer. 2: 46. 1798.

Branchlets and foliage glabrous or nearly, somewhat puberulous when young and the leaflets pilose in the nerve axils beneath, minutely lepidote but with no scaly coat; leaflets 3 (always?), rather ovate, mostly cuneate at base, acuminate, highly variable in size, the larger terminal one often a dm. long or longer, usually somewhat less than half as wide, sometimes crenate, papery to coriaceous, ultimate veinlets scarcely raised above, not at all beneath, extremely intricately reticulate; inflorescences ordinarily on leafless branchlets, the cymes or 1-flowered pedicels in umbelliform fascicles; calyx finely stellate pubescent; corolla 6–8 cm. long, yellow, glabrous, but somewhat and weakly long-pilose within; ovary grooved, sparsely lepidote, more or less tubercled with patelliform glands, ovules pluriseriate; capsule linear, attenuate to apex, attains at least 4.5 dm. in length, 2 cm. in width.—Earliest name for several similar trees, perhaps distinct; apparently no illustration has been published! A plant from Guayaquil is said to have corolla glabrous within. *T. ecuadoriensis* Standley, Trop. Woods 45: 17. 1936 (type, Guayaquil), ex char., with 3 leaflets, corollas 5–6.5 cm. long, villous within, calyx stellate-tomentose, capsule 3.5 dm. long, 1 cm. wide, may occur; an herbarium name by Bureau may refer to one of these.

Loreto (probably). Colombia to Bolivia and Trinidad. "Chonta."

37. CYBISTAX Mart.

Yangua Spruce, Journ. Linn. Soc. 3: 197. 1859.

Branchlets terete or subtetragonous, the younger lenticellate. Leaves opposite, the lower bipinnate (Martius), the upper digitately 5–9-foliolate, the petiolulate leaflets elliptic, acuminate both ends, submembranous. Panicles terminal, subcorymbose, many-flowered. Calyx ventricose-campanulate, 5-nerved, the broadly ovate lobes cuspidate. Corolla tubular, limb expanded. Staminode rudimentary. Anther cells linear, obtuse, divergent. Disk fleshy. Ovary striate, conical-cylindric, stigma bilamellate. Capsule linear-oblong, acuminate, valves contrary to septum fide Martius, costate seeds

subelliptic, alate all around, 3-seriate.—Green- or greenish-flowered trees scattered in the half-xerophytic tropical savannahs up to 1,300 meters; with the maturing of the fruit the leaves fall (Weberbauer); easily detached in drying, to which probably the name alludes (DeCandolle).

Cybistax quinquefolia (Vell.) Macbr., comb. nov. *Bignonia quinquefolia* Vell. Fl. Flum. 252. 1825; 6: *pl. 50. C. antisyphilitica* Mart. ex DC. Prodr. 9: 199. 1845. *B. viridiflora* Lodd. Bot. Cat. 11: *pl. 1026.* 1825 (nomen nudum). *Yangua tinctoria* Spruce, Journ. Linn. Soc. 3: 198. 1859.

Sometimes many meters tall, the trunk deeply sulcate; leaflets 5–9 (often 7 in Peru), lanceolate or subobovate, more or less acute, pellucid-punctate, glabrous (see remarks below), the younger serrate; panicles short; calyx long-persisting, whitish, membranous, lax, 5-plicate, much broader than corolla base, this tubular and a little longer (16 mm.); calyx lobes short ovate, abruptly cusped; corolla pale green, pulverulent without, tomentulose within, about 7 cm. long, the subequal lobes short-ovate, subrecurved; filaments shortly stipitate, glandular; capsule linear-fusiform, acute, about 2.5 dm. long, 5 cm. broad, 2.5 cm. thick, acutely 12-angled, 12-sulcate; seeds about 2.5×4–5 cm.—Commonly planted, never seen truly wild (Spruce).

Calyx shown by Gomes, Rodriguézia 32: 130, *fig. 9;* fruit, *fig. 14.* The plant of Peru probably distinct, may be (*Y. tinctoria* Spruce) *C. Sprucei* Schum. Pflanzenfam. 4, Abt. 3b: 240. 1894, properly requiring the use of Spruce's name. Unlike the Brazilian plant the corolla is apparently not papillose, is tomentulose within, the stamens only half as long as corolla, the capsule 12-angled, 12-sulcate, but, even so, perhaps the species is variable in these characters as in pubescence, this a puberulence more or less developed, sometimes lacking. It may also be significant that no examples outside of the influence of some cultivation have been recorded.

Sometimes cultivated (as on the Río Huallaga, *Weberbauer 6819*) for its leaves, which are used as a substitute for the blue dye of indigo.

San Martín: Tarapoto, *Spruce 4267* (type, *Y. tinctoria*). Río Huallaga, *Weberbauer 6819;* 316.—Loreto: Yurimaguas, (*Spruce*).—Cuzco: Urubamba Valley, *Weberbauer,* 277. Santa Ana, *Cook & Gilbert 1465.* Bolivia; Brazil. "Yangu tinctoria," "Yangua" (both Spruce), "orcco-huoranhuay" (Cook & Gilbert).

38. GODMANIA Hemsley

Tree resembling *Tabebuia* and *Cybistax* but the small flowers with pilose stamens, and the fruit costate as in the latter. Leaves mostly 7-foliolate. Flowers many, corymbosely crowded. Kränzlin remarked the apparent weakness of this segregate. This is, obviously, as so often in this family, an arbitrary genus, proposed by the author, surely, as a courtesy; F. Ducane Godman (with Osbert Sabin) edited the Biologia Centrali-Americana; the botanical part was written by Hemsley.

Godmania aesculifolia (HBK.) Standley, Lista Prelim. Pl. St. Salvador 200. 1925. *Bignonia aesculifolia* HBK. Nov. Gen. & Sp. 3: 140. 1819. *G. Uleana* Kränzl. Notizbl. Bot. Gart. Berlin 6: 379. 1915, fide Sandwith.

Early puberulent at tips; leaflets ovate or suboblong, acute or acuminate at both ends, often 1–1.5 dm. long, pilose or glabrate and glandular-lepidote beneath; calyx 1 mm. long, puberulent as corolla, this 10–13 mm. long, campanulate-ventricose, barbate within; capsule to 7 dm. long, 1.5 cm. broad, regularly 16-costate.

Peru (probably). Bolivia and Amazonian Brazil to Mexico and British Guiana.

39. SPARATTOSPERMA Mart.

Erect shrubs or trees with digitately foliolate leaves and terminal subcorymbose panicles of white or tinted funnelform flowers. Calyx tubular, more or less parted. Ovary in a fleshy conical disk. Stigmas linear, erect. Capsule subterete, elongate. Valves contrary to septum, only medially subquadrate. Seeds linear, long-alate, the wings finely lacerate simulating a pappus.—Pollen brokenly alveolate, not sulcate (Gomes, Rodriguésia 20: 130, *fig. 27*).

Sparattosperma leucanthum (Vell.) Schum. Pflanzenfam. 4, Abt. 3b: 235. 1894. *Bignonia leucantha* Vell. Fl. Flum. text 251. 1825. *Spathodea vernicosa* Cham. in Linnaea 7: 661. 1832. *S. vernicosum* (Cham.) Bur. & Sch. in Mart. Fl. Bras. 8, pt. 2: 354, *pl. 116*. 1896. *S. lithontripticum* Mart. ex DC. Prodr. 9: 203. 1845.

Quite glabrous including the corollas in anthesis (these funnelform-campanulate above the narrow short tube) and, except the flowers, lustrous as if with varnish or lacquer; petioles (1.5 dm. long or longer) and petiolules (1–4 cm. long in each leaf) canaliculate, the

lower with 5 leaflets, the upper 3 oblong-elliptic caudate- (and acutely) acuminate, obliquely rounded at base, the larger 1.5 dm. long, to 6 cm. wide, the outer much smaller, membranous, the 8–12 pairs of slender nerves impressed above, raised beneath; calyx tubular-subconic, 2 cm. long, unevenly lobed; corolla 6 cm. long, limb 3 cm. across; capsule elongate, subterete, the seeds 2.5 cm. long, scarcely 2 mm. broad.—Calyx drawing in Gomes, Rodriguésia 32: 130, *fig. 12.* Nodes of the soon subterete branches enlarged. Attains 10 meters, the flowers white and lilac (Klug).

San Martín: Chazuta, *Klug 3964* (det. Standley).—Loreto: Mishuyacu, *Klug 1019* (det. Sandwith).—Madre de Díos: Maldonaldo, *Seibert 1898* (det. Sandwith). Brazil. "Quinilla" (Seibert).

40. DELOSTOMA D. Don

Shrubs with opposite simple pinnately nerved leaves, the terminal nearly bractless, few-flowered (often 1–2) racemes between opposite branchlets. Calyx coriaceous, ribbed, early obovate, acutely closed, later bi- (tri-) labiate, the acuminate lobes teretely calloused, or double. Corolla tubular, little incurved, slightly bilabiate, the lobes rounded. Filaments hirtellous basally, the sterile ones short or obsolete. Style filiform, stigma bilamellate. Capsule oblong, compressed, attenuate at least to base, apically calloused, the oval transverse seeds apically shortly, otherwise broadly alate.—Calyx allies it to *Tabebuia* but valves are parallel and seeds many seriate (DeCandolle, Prodr. 9: 197. 1845).

Calyx simple; leaves entire or subentire.

Corolla 2.5–3.5 cm. across at apex; calyx subscurfy. *D. Weberbauerianum.*

Corolla usually about 2 cm. across at apex; calyx glabrous or glabrate. . . . . *D. integrifolium.*

Calyx more or less double; leaves rarely subentire.

Flowers on maturely foliose branchlets. . . . . *D. dentatum.*

Flowers on leafless branchlets or leaves not fully developed, or few. *D. Lobbii.*

Delostoma dentatum D. Don, Edinb. Phil. Journ. 18: 263. 1823; 351.

Fruiting branchlets scarred, glabrate, the younger as the leaves beneath more or less pubescent; leaves elliptic-oblong, closely denticulate,

3.5–7.5 cm. long, about 2–3 cm. wide or larger, rounded-mucronate or acute, prominently nerved beneath; inflorescences subumbellate, pedicels about 8 mm. long; calyx turbinate-campanulate, about 1.5 cm. long, inner lobes 5–6, outer 3–4 mm. long, divaricate; corolla roseate, 6 cm. long, glabrous except puberulent above and near stamen insertion; ovary purplish; capsules a dm. long, 2 cm. thick, black.—*D. loxense* (Benth.) Sandw. Lilloa 14: 136. 1948 (*Tabebuia loxensis* Benth. Pl. Hartw. 354. 1839) has, according to Sandwith, the double calyx of this species but the entire leaves of *D. integrifolium*, these, however, shorter, broader, ovate-elliptic, rounded or subcuspidate, corolla densely tomentose, outer calyx lobes obscure, black tubercles or obsolete as for *D. Hookeri* Kränzl. Bot. Jahrb. 54, Beibl. 119: 25. 1916, also of Ecuador (Bot. Mag. *5754* as *D. dentatum*, not of Don), and indeed the Kränzlin plant may be the same; certainly a study of the group is in order, and my key thus only suggestive. *Bignonia rosea* Pavón in herb. (Don) is *D. dentatum* D. Don, fide DC. Forms a loose underbrush (Weberbauer). Illustrated, Karsten, Fl. Colombia 2. *pl. 119*, as *Codazzia* (fide Schumann); cf. *Lobbii*. F.M. Neg. 26208.

Lima: Río Chillón, *Pennell 14442*. Matucana, *75; 218; 2934; Asplund 10951*.—Ayacucho: Coracora, 2,600 meters, *Weberbauer 5792* (det. Melchior).

Delostoma integrifolium D. Don. Edinb. Phil. Journ. 18: 264. 1823; 349. *D. nervosum* [Dombey] DC. Prodr. 9: 198. 1845, fide Sandwith.

Branches lenticellate, early more or less pubescent as at least the petioles (2.5 cm. long), leaf-nerves and peduncles; leaves elliptic-oblong, a dm. or so long, about half as wide, acutely short-acuminate, the 2 basal nerves almost parallel to the entire margin, the leaves impressed above, strongly reticulate beneath; thyrse shorter than leaves, pedicels to 1 cm. long; calyx with 4 or 5 impressed glands, ellipsoid, pointed in bud, 2–3-lobed at anthesis, the divisions callose-cuspidate or acuminate; corolla 5 cm. long, tube 3.5 cm. long, lobes 1.5 cm. long; filaments pilose near base; ovary glabrous; capsule lanceolate, compressed, seeds many-seriate, alate.—This is *Bignonia rosea* Pavón in herb. fide Don. *Seibert 2095*, Lima Botanical Garden, may be this (Sandwith, in herb.). Illustrated, Karsten, Fl. Colombia 2: *pl. 120*. F.M. Neg. 7650.

Huánuco: Near Huánuco, *Ruiz & Pavón*, type; *Dombey* (type, *D. nervosum*). Also at Cheuchin. "Huarama," "huaruma."

Delostoma Lobbii Seem. Bonplandia 10: 72. 1862.

Branchlets, leaves and calyx almost woolly-pilose (the leaves beneath) to quite glabrous; leaves vary in shape and size, lacking or mostly at appearance of the 1–2 terminal flowers; pedicels 5–10 mm. long; calyx about 1.5 cm. long, the lobes scarcely 5 mm. long; corolla deep crimson, the indument on tube and lobes variable, the tube narrowly tubular-funnelform, 4–5 cm. long, the lobes 1–1.5 cm. long; stamens and style exserted; capsule elliptic-oblong, apparently not beaked-attenuate, 5–5.5 cm. long, about 2 cm. broad, smooth, drying black, glabrous (except minutely scaly); seeds elliptic, to 17 mm. long, 23 mm. broad, dark brown nitid embryo, much paler membranous wings (Sandwith).

A Forgotten River by C. Sandeman (1939), wherein (p. 252) this plant is mentioned, is a readily remembered book; to it Sandwith refers, Kew Bull. 1954: 598. 1955, in giving some descriptive notes (included above). Determinations by Sandwith, who remarks, with his usual good sense—speaking of degree of indument, especially less or absent in southern part of range—that "surely one must expect a good deal of variation in this shrub, which occurs between 1,000 and 2,600 meters, no doubt in many kinds of situations."

Cajamarca: Cajabamba, *Velarde 2985*.—Amazonas: Chachapoyas, (*Lobb*, type). Above Balsas, (*Sandeman 20*).—La Libertad: Parcay, 2,700 meters, *Weberbauer 7086*. Otusco, *Scolnik 1280* (det. Sandwith).—Ayacucho: Pajonal, *West 3675* (det. Johnston).—Apurímac: Abancay, *Vargas 1270; 9608* (*Pearce*). Rocky slope, Jesus y Maria, Prov. Abancay, *Vargas 9608* (det. *D. dentatum* in herb.). Grass steppes, Prov. Andahuaylas, 1,800–2,600 meters, *Weberbauer 5879*.—Cuzco: Torontoy, Urubamba Valley, *Cook & Gilbert 823?* (leaves large). Ecuador. "Pichus" (West), "montetunya."

Delostoma Weberbauerianum Kränzl. Bot. Jahrb. 54, Beibl. 119: 25. 1916.

Type a 10-meter tree, the branches copiously lenticellate, the leaves quite entire, to 12 cm. long, 8 cm. wide, obscurely pulverulent beneath; calyx simple, unevenly 3-dentate, coriaceous, furfuraceous, 1 cm. long, 7–8 mm. across; corolla funnelform, equally puberulent in and out, 4.5 cm. long, 7–8 mm. broad at base, 2.5–3 cm. across at top; stamens affixed in pilose base of corolla, the larger 13 mm. long; style 3.5 cm. long.—Flowers of *D. roseum* Schum. (author). A specimen from Otusco at 2,860 meters (*Ochoa 1452*) has been

referred by Sandwith to the Colombian *D. roseum* (Karst.) Tr. sens. lat. with query, ex char. perhaps one species concerned.

Piura: Ayavaca to Río Quiros, *Weberbauer 6386*, type.

41. SCHLEGELIA Miq.

Scandent, often by rootlets, the smooth pale branchlets without glandular areas, nitidulous as finally the simple leaves. Pseudostipules early obvious, opposite, subulate. Calyx subtubular to campanulate, truncate or unevenly lobed, obsoletely denticulate. Flowers (Peru) in short axillary panicles or clusters, small, glabrous. Ovary 2-celled, ovoid, glabrous, divided horizontally by a raised line, the upper half small, the lower half thicker, roughed (by an adnate disk? Sandwith); ovules irregularly about 6-seriate, affixed to an elliptic or semiorbicular placenta, this attached to the septum; style nearly as long as ovary or shorter. Fruit berry-like but pericarp crustaceous and somewhat enclosed in the accrescent calyx. Seeds thick, compressed, oblong, angled, pitted-reticulate or punctate.

Genus has been referred in herbaria to *Citharexylum* and *Aegiphila* because of superficial resemblance while flowers and seeds suggest Scrophulariaceae (see Monachino, Phytologia 3: 104–105. 1949); cf. Sandwith, Kew Bull. 210. 1930.

Panicles to 2 dm. long, terminal or also lateral.....*S. scandens.*
Panicles to 4 cm. long, lateral.....*S. parviflora.*

Schlegelia parviflora (Oersted) Monachino, Phytologia 3: 103. 1949. *Dermatocalyx parviflorus* Oersted, Vidensk. Meddels. Naturh. Foren. 29. 1856. *S. Ramizii* Sandw. Kew Bull. 211. 1930, vars., Kew Bull. 303. 1940, fide author, l.c. 440. 1959. *S. roseiflora* Ducke, Trop. Woods 76: 29. 1943 (Sandwith).

Robust, glabrous (or inflorescence glabrescent), branchlets (always?) without rootlets, sparsely lenticellate, the younger angulate; stipules lanceolate, acuminate, 4–6 mm. long; petioles glandular within near base; leaves oblong-elliptic or -obovate, obtuse or narrowly round each end, often about 7–10 cm. long, 2.5–5 cm. wide, rigid-coriaceous, more lustrous above than beneath, lateral nerves 5–7 (10–12, Sandwith), immersed above, veinlets obscure (reticulation prominent, Sandwith); panicles subracemose in axils of fallen leaves, 1–4 cm. long, sometimes pilosulous unless sub-bilabiate calyx (this 4–6 mm. long) and corolla, this white or roseate with

glabrous tube about 8 mm. long, lobes papillose within, 5 mm. long (or longer); filaments finally about 2 mm. long, villous as staminodes toward base (Monachino) or papillose (Sandwith, var.); fruit to 12 mm. in diameter (Sandwith).—Mostly after Ducke's description, l.c., where he gave a key to the Amazonian and Guiana species. Liana or 6-meter tree, the flowers white (Klug); this was given an herbarium name after Peru by Standley and is var. *macrandra* Sandw. l.c. 303, glabrescent, corolla lobes to 7.5 mm. long, filaments glabrous or pilose-papillate, anthers exserted.

Loreto: Río Zubineta at Río Putumayo, *Klug 2340* (type, var. *macrandra*); also *2191*. Southern Brazil to Central America. "Ocugui-o" (Klug).

Schlegelia scandens (Briq. & Spruce) Sandw. Kew Bull. 214. 1930. *Citharexylum scandens* Briq. & Spruce, Bull. Herb. Boiss. 4: 341. 1896. *S. albiflora* Kuhlm. An. Prim. Reun. Sul-Amer. Bot. 1938, 3: 89. 1940, fide Sandwith, Kew Bull. 1953: 459. 1954.

Leaves elliptic or suboblong, rounded at base, obtuse, shortly petioled, glabrous, coriaceous, lustrous above, 1–1.5 dm. long, marginally recurved; racemes to 9 cm. long; pedicels 1–3 mm. long; calyx 5 mm. long, later 3–4 mm. high, to 8 mm. across, entire or suberose; corolla cylindric, to 1 cm. long, obliquely lobed, lobes 2 mm. long; stamens inserted lower third of tube, smooth as shortly bilobed style; drupe fleshy, 10–13 mm. in diameter.—After Briquet; Kuhlmann noted 6–9 nerves, fleshy glands at leaf-base, black glandular pores, inflorescence racemose-paniculate, corolla tube pilose within as segments and subacute anther cells; Grisebach described a short terminal corymb, younger leaves powdered with white points, calyx cylindric, 2-lipped; anther cells blunt.—Probably, as Sandwith suggested, these apparent differences are within the variation range of a single species. Branches may root at nodes; large plate-shaped glands are at base of leaves beneath; Kuhlmann's plant I regard as simply a white-flowered form, and *S. scandens* should probably be reduced to *S. violacea* (Aublet) Griseb. Fl. Brit. West Indies 445. 1864, Sandwith, and as implied by Ducke.

Loreto: Mishuyacu, *Klug 443*. Northern Brazil.

42. CRESCENTIA L.

Small pale-barked trees with gourd-like indehiscent fruits, simple (Peru) or trifoliolate leaves disposed spirally in alternate fascicles

(2 or 3 leaves) and openly campanulate flowers, 1–3-pedunculate on the old wood, the very broad tube dilated and transversely plicate below the middle.

A curious unmistakable ornamental plant, the thin hard shell of the fruit sometimes used as a container, often carved or decorated as is the squash; the thick wingless seeds, after removal of the pulp, are edible when cooked.

The African *Kegelia pinnata* (Jacq.) DC. with pinnate leaves, racemose broadly campanulate orange or wine-red flowers, 5-lobed calyx, and elongate-ellipsoid fruits (similar to *Crescentia*) was collected by Soukup without data.

Otto Porsch, Oesterr. Bot. Zeitschr. 80: 31–44. 1931, gave an interesting account (with bibliography and illustrations) of *Crescentia* as a "Fledermausblume" (visited by bats).

Crescentia cujete L. Sp. Pl. 1: 626. 1753; 83.

Leaves more or less oblanceolate, long-attenuate to base, rounded to shortly cuspidate, chartaceous, lustrous, glabrous, or pilosulous beneath on the nerves; calyx deeply split; corolla usually yellowish- or greenish-white with red-purple veins, 4–7 cm. long; disk thick, yellowish; fruit variable in shape and size, sometimes 3 dm. long.—Widely cultivated and apparently naturalized, as in Loreto where often in water (Tessmann); sometimes 20 meters tall; Williams, Field Mus. Bot. 15: 445. 1936, found it as an escape and gave a description of the hard wood, useful for handles, etc.

San Martín: Tarapoto, *Woytkowski 35155*.—Loreto: Lower Río Itaya, Nanay, *Williams 192; 545*. Iquitos, *Klug 1480; Killip & Smith 27428*. Yarina Cocha, *Tessman 3478*.—Cuzco: Hacienda Santa Rosa, *Soukup 797*. Santa Ana, *Cook & Gilbert 1683*. Tropical America. "Pati" (Record), "cayeira" (Spruce), "huingo" (Williams), "tutumo," "buhango."

43. ECCREMOCARPUS R. & P.

Half-shrubs or scandent, the stems sulcate-angulate, the opposite leaves finely bi- or tripinnate, the petioles produced into a branched tendril; peduncles opposite the leaves terminating in a lax few-flowered pendulous raceme of bicolored flowers. Calyx amply tubular-campanulate, acutely parted, inflated-persisting. Corolla tubular, the lobes rounded. Anther cells completely joined; stamen rudimentary. Ovary 1-celled, the 2 valves medially placentiferous. Cap-

sule ovoid, subquadrate-sulcate. Seeds imbricate, lenticular, with a membranous radiately striate margin.

Leaves glabrous above, canescent beneath; leaflets 3 pairs; calyx red, 4 cm. long, corolla yellow, 7.5 cm. long.....*E. longiflorus.*

Leaves pulverulent above, puberulent beneath; leaflets 2 pairs; calyx 5–8 cm. long, corolla to 12 cm. long, both yellow-green. *E. viridis.*

Leaflets pilose, 2–3 pairs; calyx fulvous, 4.5 cm. long, corolla yellow, 6 cm. long.....*E. huainaccapac.*

Eccremocarpus huainaccapac Vargas, Bol. Soc. Peru. Bot. 1: 15. 1948.

Pilose slender shrub-liana, the leaves with 2–3 pairs of oval leaflets; flowers in axillary racemes, the peduncles 2–2.5 cm. long, often 10 or 12; bracts oval-lanceolate, 2–2.5 cm. long, 4–5 mm. wide; calyx fulvous, 4.5 cm. long, pilose, the segments acute; corolla yellow, to 6 cm. long, the small glaucous pilose lobes lightly curved; capsules 3 cm. long, the membranous alate seeds 4 mm. long.—Apparently nearest *E. longiflorus* as suggested by the author, and probably the Cuzco specimens so determined actually are referable to this southern representative of the genus. Also, *Vargas 5956* from near Penas, Province of Urubamba, determined by Vargas as *E. viridis* R. & P., is either a rather notable range extension or points up the apparently tenuous characters between these similar plants. The author's happy choice of name gives botanical recognition to the last Inca king, Huainaccapac.

Cuzco: Quesser-huailla, Prov. Cuzco, 3,900 meters, (*Vargas 3034*, type). "Chucchucha."

Eccremocarpus longiflorus Humb. & Bonpl. Pl. Aequin. 1: 229, *pl. 65.* 1808.

High climbing vine; nodes early puberulent-tomentulose as petioles; leaves tripinnate, the oval obtuse leaflets mostly undivided, the terminal 3-lobed; flowers pendent on long peduncles; calyx red, campanulate, about 4 cm. long and wide, the ovate finely apiculate lobes half as long; corolla 7.5 cm. long, the tube subarcuate, yellow, little dilated at base at stamen insertion; stigma bifid, the lobes subulate; capsule 1-celled, oblong-ovoid or -obovoid, subangled; seeds many, imbricate, lentiform, fimbriately margined.—The flowers hang on long thin peduncles, the bladder-like calyx rose-

colored, the corolla throat blue-green (Weberbauer). F.M. Neg. 39401. Type from Mt. Saraguro, southern Ecuador.

Cajamarca: Huambos, Prov. Chota, *Weberbauer*, 192; 260.—Cuzco: Panticalla Pass, 3,600 meters, *Cook & Gilbert 1237; Weberbauer 4938;* 243, 244. Ecuador.

Eccremocarpus viridis R. & P. Prodr. 90, *pl. 18.* 1794; Syst. 157. 1798.

Stems and branches acutely quadrate or grooved also between the angles, about 3 mm. thick, 5 mm. thick at nodes, sparsely puberulent; leaves about 5 cm. long, bipinnate, the leaflets ovate-oblong or elliptic, entire or the terminal and sometimes a few lateral with a lobule, the larger 8 mm. long, half as wide, puberulent-villosulous beneath, pulverulent above; racemes to 3 dm. long, pedicels recurved, subfiliform, 5–7 cm. long; calyx (in flower) 5 cm. long, about 3 cm. wide, the lobes ovate, acuminate, about 3 cm. long; corolla to 12 cm. long, about 1 cm. wide, nearly straight, subtubular, lobes rounded, a few mm. long, erect, glabrous within and without; staminodes slightly exserted.—Description from negative and my collection; flowers green, toward base, as calyx, yellowish-green. F.M. Neg. 29234.

Huánuco: Muña, (*Ruiz & Pavón*, type). Tambo de Vaca, *4371* (det. Johnston, *E. longiflorus*).

44. CALAMPELIS D. Don

Similar to *Eccremocarpus* R. & P. but pedicels short, calyx small, not inflated, corolla ventricose, anther cells distinct above, divaricate, capsules stiped, long-ovoid.—Flowers orange-red, several to many, about equaled by the ascending pedicels. Ruiz and Pavón included this in their genus but their description of calyx, corollas and anthers applies to *Eccremocarpus viridis* R. & P. The genus perhaps merits recognition as a logical segregate in a family containing many similar traditionally maintained groups; however, Karl Schumann, Pflanzenfam. 4, Abt. 3b: 244, *fig. 93.* 1894, and apparently all later students followed DeCandolle in regarding it as representing a section. Darwin, in his *On the Movements and Habits of Climbing Plants*, used this plant as one example (Hooker, Bot. Mag. 3: 35, *pl. 6408.* 1879).

Calampelis scaber (R. & P.) D. Don, Edinb. Phil. Journ. 7: 89. 1829. *Eccremocarpus scaber* R. & P. Prodr. 90. 1794.

Stems quadrate, sulcate; leaves pulverulent, bipinnate, the leaflets ovate, obliquely cordate at base, acute, entire or serrate, the

larger 1–2 cm. wide; tendrils 2–3-parted; peduncles with a linear acute basal bract; racemes spreading-ascending, 1–1.5 dm. long, pedicels 2–3.5 cm. long; flowers turning to one side; corolla 2–3 cm. long, ventrally enlarged, contracted below, tube glandular as anthers and calyx; capsules inflated-membranous, attenuate to the stipe, 4–5 cm. long; seed wings lustrous, sinuate-margined.—A popular and much illustrated ornamental of subtropical gardens; there are horticultural variants with red or golden flowers. In Chile becomes ligneous below.

Puno: Uplands above Lake Titicaca, 3,125 meters, *Shephard 9* (det. B. L. Robinson). Chile; Argentina.

45. **TOURRETTIA** Fouger

Dombeya L'Hér. Stirp. Nov. 1: 33. 1784.

A glabrous herb forming tangled masses or scandent, dichotomous as to branches. Leaves opposite, ternately pinnate, one of the two lower pinnae produced into a finely branched tendril; spike bracteate and largely sterile toward apex, the sterile calyces colored. Calyx biparted, the narrow acuminate upper lobe entire, sometimes corniculate posteriorly, the lower 4-crenulate. Corolla purple-violet, tubular, the upper lip cupulately produced, enveloping the 4 stamens. Ovary reflexed, asperous, early 4-celled, ovules many, uniseriate. Capsule ovoid, coriaceous, echinate, 2-celled, the 2 valves apically dehiscent, alately extended each side, thus nearly 4-celled. Seeds few, compressed, alate all around.—Named for La Tourette, Lugdavian botanist.

Tourrettia lappacea (L'Hér.) Willd. Sp. Pl. 3: 263. 1800. *Dombeya lappacea* L'Hér. Stirp. Nov. 1: 33, *pl. 17.* 1784. *T. volubilis* Gmelin, Syst. Veg. 2: 940. 1791.

The only species; leaves unevenly and coarsely serrate or sometimes lobulate, the terminal leaflet to about 3 cm. long, half as wide; fruits oblong-ovoid, the hard (ligneous?) body to 4 cm. long, 1.5 cm. thick, apically densely uncinate prickles, otherwise covered with much shorter, finally straight prickles mixed with echinate ones, the coarser to 1.5 cm. long.—My collection with scarlet bracts, purplish flowers, was in rocks as Ferreyra's, this with greenish-white corollas. Illustrated, Bot. Mag. *pl. 3749.*

Cajamarca: San Miguel, *Weberbauer 5246;* 188.—Lima: Amancaës and Chancay, *Ruiz & Pavón,* type. Granado Hills, *Goodspeed*

Exped. 9299; Lurín, *5953.* Cerro San Geronimo, *Soukup 1290; 1550.* Lomas de Atocongo, (*Ferreyra 4018; Verne Grant 7507*). Lomas de Lachay, (*Ferreyra 3881*). To Mexico.

COLUMELLIACEAE Lindl.

Closely branched shrubs or small trees, the younger parts sericeous-canescent with minute trichomes. Leaves apparently entire or with a few serrations, petioles somewhat connate at base, stipules none. Flowers hermaphrodite, slightly irregular, in terminal, often furcate cymes. Calyx tube adnate to the nearly completely inferior ovary, the 5 lobes scarcely imbricate. Stamens 2, affixed near base, the anther cells usually strikingly 2–3-coiled on an irregular dilated connective. Style short, thick, stigma shortly 2–4-lobed. Ovary hemispheric, ovules many on 2 parietal bifid placentae that project into the axis of the cell, then coalesce to form a partly 2-celled ovary. Capsule septicidally 2-valved, the valves bifid in the persisting calyx. Seeds many.—Similar to Gesneriaceae.

COLUMELLIA R. & P.

Reference: Schlechter, Notizbl. Bot. Gart. Berlin 7: 11. 1920.

Character of the family. The hard wood is used for utensils and an infusion of the bitter leaves is wonderfully effective for tertian fevers (Ruiz and Pavón).

Leaves oblong-lanceolate or subobovate, mostly 2–5 cm. long. *C. oblonga.*

Leaves mostly obovate, larger..... *C. obovata.*

Columellia oblonga R. & P. Fl. Peruv. 1: 28, *pl. 8, fig. a.* 1798. *C. sericea* HBK. Nov. Gen. & Sp. 2: 388. 1818, fide Fritsch, Pflanzenreich IV: 3: 188. 1897. *C. Mathewsii* Briq. Ann. Cons. Jard. Bot. Genéve 20: 367. 1918. *C. Andrei* Macbr. Field Mus. Bot. 4: 92. 1925.

A small erect much-branched tree, the opposite more or less quadrate branches brown-barked, the branchlets minutely and in greater or less degree sericeous as the younger leaves beneath; leaves oblong or somewhat obovate, narrowed to a short or obscure petiole, subacute or apiculate, entire or sparsely serrate, 2–5 cm. long, about half as wide, coriaceous, glabrous and lustrous above; cymes shortly peduncled, terminal and on short lateral branchlets, laxly 6–10-flow-

ered, sericeous; pedicels short or to 1.5 cm. long, bracted; calyx lobes unequal, oblong, subacute; corolla coriaceous, yellow, the suborbicular lobes subconcave; anther cells sinuous to contorted.—Schlechter, l.c. recognized six species, not including that proposed by Briquet, on the basis of wider and longer (3.5×2 cm.) quite entire leaves, notably longer (5 mm. long) hypanthium, larger calyx (lobes 4–5 mm. long, 2 mm. wide), corolla (lobes 7×7 mm.) and capsule (1 cm. long including upper part); these relative differences are all within the scope of expected variation and the same remark applies to the plant described by me. *C. sericea* HBK. collected near Guayaquil, the leaves appressed pubescent beneath, was accepted by Mansfeld in herb. and may be recognizable as a variant. Woytkowski's specimen was from a 2-meter tree, the canary yellow flowers with orange anthers. Illustrated, Fritsch, l.c. 187 (branch, flower parts); Bot. Mag. *pl. 6183.*

Amazonas: Chachapoyas, (*Mathews*, type, *C. Mathewsii*).—Huánuco: Pillao, *Ruiz & Pavón*, type. Pillao, Río Chaglia, *Woytkowski 34607* (det. Cuatrecasas).—Cuzco: Yanamanche, Prov. Urubamba, 2600 meters, *Weberbauer 4983;* 244, 245. Marcapata, 3300 meters, *Weberbauer 7791.*

Columellia obovata R. & P. Fl. Peruv. 1: 28, *pl. 8, fig. b.* 1798.

Much-branched shrub or tree, in general resembling *C. oblonga;* leaves sessile, obovate, glaucous, canescent sericeous beneath, the larger dentate; flowers 1–3, terminal, yellowish.—Perhaps distinct; type had some leaves remotely denticulate, that is, with 2 or 3 minute teeth each edge, mostly entire, all about 7 cm. long, 5 cm. wide, deciduously pilose beneath.

Cajamarca: Huaraz, Weberbauer, 179.—Junín: Tarma, *Ruiz & Pavón*, type.—Ayacucho: Near Ayacucho, 3300 meters, *Weberbauer 5482;* at 2900 meters, *5584* (leaves denticulate). "Ullux," "ullus," "usluss" (Ruiz & Pavón).

Since the above data were assembled a taxonomic introduction to "a comparative anatomical and taxonomic study" now in progress by W. L. Stern and G. K. Brizicky has appeared, written by the latter, Journ. Arn. Arb. 42: 363–372. 1961. According to Dr. Brizicky the usually 5 calyx lobes may be 4, 6, possibly 8; stamens, rarely 3, and he cites Erdtman, Pollen Morphology and Plant Taxonomy, who

recorded pollen grains as somewhat different in size for *C. oblonga, C. obovata, C. sericea.* Finally, as to Peru, Brizicky distinguishes *C. oblonga* particularly by the leaves, these obviously inequilateral, pergamentaceous to subcoriaceous, the lateral nerves distinct, and recognizes *C. sericea* (including *C. Mathewsii*) as a subspecies, in more or less degree with entire leaves, subcampanulate corolla, well-adnate filaments; he, no doubt correctly, reduces my *C. Andrei* to *C. lucida* Danguy et Chermezon, Bull. Mus. Hist. Nat. Paris 28: 436. 1922, but remarks that *C. lucida* may eventually prove to be treated best as a variety of *C. oblonga* R. & P., subsp. *sericea* (HBK.) Brizicky; his morphological synopsis is commendable for the careful observations.

OROBANCHACEAE

Reference: Günther, Beck-Mannagetta, Pflanzenreich IV: 261. 1930.

Yellowish-brown, leafless (leaves reduced to scales), stout, bracteate, glandular-pubescent plants with funnelform bilabiate 4-merous corollas, deeply 5-dentate calyces, the latter, as the former, more or less persisting in fruit. Stamens affixed below middle of corolla tube. Ovary 1-celled with 2–4 parietal placentae; style elongate, stigma conspicuous. Capsule 2-valved, seeds many.—Family has been regarded as a parasitic development of the Gesneriaceae or the Scrophulariaceae, the ovary of the latter rarely 2-celled.

OROBANCHE L.

Character for Peru mostly as above; bractlets 2, adnate to pedicel or calyx; placentae normally 4.

Flowers sessile (lower subsessile), 2 cm. long.....*O. tacnaensis.*
Flowers long-pedicellate (except upper), 2.5 cm. long . *O. Weberbaueri.*

Orobanche tacnaensis Mattfeld, Notizbl. Bot. Gart. Berlin 8: 185. 1922; 59.

Glandular pubescent unless in age, even the flowers, except the corolla, glabrous below, glandular-pilose above; stem sometimes branched at strongly clavate base, more or less squamate, to 2.5 dm. tall; scales ovate-lanceolate, to 2 cm. long; spikes elongate-cylindric, obtuse, laxly flowered only toward base; bracts lanceolate-elliptic, acute, to 1.7 cm. long, 5 mm. wide; bractlets linear-lanceolate, about 12 mm. long, 1 mm. wide; calyx scutellate at base, deeply and nearly

regularly 5-parted, 1.5 cm. long, the tube 4 mm. long, the teeth 12 mm. long, 2 mm. wide, all the outer surface reddish glandular-pruinose pubescent; corolla strongly constricted above stamen insertion (this about 7 mm. above the base), somewhat incurved and gradually much ampliate to the throat, the upper lip biparted, the lower lobe rounded-ovate, glandular pilose; filaments glabrous, 1 cm. long, anthers 2 mm. long; ovary ellipsoid, glabrous as style, this 1 cm. long, the 2 distinctly free lobes oblong, canaliculate; placentae sometimes confluent with carpels; capsule 1 cm. long, 2–3-valved to base; seed reticulation conspicuous.—After author, who compared the species to the Californian *O. balbosa* Beck, that with flowers scurfy, 1.5 cm. long, corolla little constricted, less ampliate and lobes all elliptic, acute; Beck, l.c., who saw only imperfect specimens, posed the question without decision; the Peruvian plant, if intermediate forms are not discovered, may be a stabilized entity.

Tacna: On *Artemisia* sp. (*Woitschach 71*, type); also (*Meyen*).

Orobanche Weberbaueri Mattfeld, Notizbl. Bot. Gart. Berlin 8: 185. 1922; 57.

Stem stout and branched above or slenderly from the little incrassate base, sparsely squamate, to 1.5 dm. high, glabrate toward base, early densely ferrugineous glandular pubescent toward apex, including the upper part of the corollas; scales broadly triangular-ovate (upper ovate-lanceolate), 5 mm. long; bracts lanceolate-ovate, to 1.5 cm. long; flowers 2.5 cm. long, the upper subsessile, the lower on pedicels to 1 cm. long; bractlets linear-lanceolate, obtuse, about 12 mm. long, 2 mm. wide, adnate below to the funnelform calyx, its tube 7–8 mm. long, 4–5 mm. broad, the 5 linear-lanceolate subequal teeth as long, 2–2.5 mm. wide; corolla little constricted above stamen insertion (this 6–7 mm. above base), only slightly curved, gradually ampliate, the upper lip parted nearly medially, the lobes finally recurved, 2.8 mm. wide, rounded-ovate, the lower lip erect, the 2 lateral lobes ovate-oblong, 3.5 mm. long, 2 mm. wide, the medial ovate, 4 mm. long, glandular-pilose; filaments 8 mm. long, hispidulous toward base, anthers 2 mm. long; ovary ellipsoid-ovoid, glabrous as style, this 7 mm. long; stigma bilobed, the lobes constricted, canaliculate; placentae free; capsule 1 cm. long, 4–5 mm. thick, bivalved to base; seeds deeply reticulate, 0.5 mm. long, 0.2 mm. wide.—After author; some species in the genus may be found to be based on tenuous characters; type not seen by Beck.

Arequipa: Chala lomas, *Weberbauer 7185*, type.

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Synonyms in *italic* type